

Telecommunications: How To Get Started

COMPUTE!

\$2.50
November
1983
Issue 42
Vol. 5, No. 11

\$185 UK \$9.25 Canada
63379
ISSN 0194-347X

The Leading Magazine Of Home, Educational, And Recreational Computing

**How To Add
Peripherals And
Choose The Right TV
For Your Computer**

***Climber:*
A Fast-paced Game
For VIC-20, TI-99/4A,
And Commodore 64**

***Goodbye Charlie:*
An Exciting Game
For Commodore 64,
Atari, And VIC-20**

**Stock Market
Analyzer For VIC-20,
Commodore 64,
And Atari**

**All About The TI-99/4A
Character Set**



**Reviews Of The New
Atari And Commodore 64
Games, A Timex/Sinclair
Printer, And TOPO The
Domestic Robot**



BUY A BANANA™. SAVE A BUNCH.

Meet the Banana™, the very tough, versatile, portable, and reliable dot-matrix printer from Gorilla™.

At \$249.95 retail it's an ideal and inexpensive companion for personal computers like Apple® (or Apple "look alikes" such as Franklin® or Albert®), TI®, Commodore®, TRS-80®, Kaypro®, Timex®, Osborne®, etc.

After that, it's merely comparable to other printers that can cost up to three times as much: 10" carriages (to handle standard 9½" paper), 80 columns, graphics capability, 10 characters per inch (expandable to 5 cpi) draft-quality print (for perfectly acceptable form letters, data processing,

business reports, etc.) tractor feed (for precise alignment and quick loading), parallel or serial interface (take your pick), self-inking ribbon cassette (for long life and easy installation), 10 portable pounds in weight, and compatibility with so many of the most popular personal computers on the market.

Plus its printhead features a unique single-hammer design that eliminates a lot of moving parts, to eliminate a lot of annoying repairs.

That's the Banana: silly name, serious service. It's everything the expensive dot-matrix printers are . . .

Except expensive.



Leading Edge Products, Inc., 225 Turnpike Street, Canton, Massachusetts 02021
Toll-free: 1-800-343-6833; In Massachusetts (617) 828-8150; Telex 951-624.

FOR YOUR COMMODORE WORDPROCESSING NEEDS INVEST IN THE BEST



WORDPRO PLUS. IN A CLASS BY ITSELF.

When choosing a Word Processor for your Commodore™ computer, there's no reason to settle for anything but the best — in a word... WordPro™.

With over 30,000 happy clients churning out letters and documents all over the world, the WordPro Plus™ Series is unquestionably the #1 selling software package on Commodore computers! So when you choose WordPro, you know you're investing in a trial-tested program that's a real winner. And WordPro is NOW available for your Commodore 64™ computer — at prices starting as low as \$89.95.

Designed for the user who has no computer or word processing experience whatsoever, WordPro Plus brings a new dimension to the term "user-friendly." More than just easy to use, WordPro will turn your Commodore computer into a sophisticated time saving word processing tool — loaded with the same inventory of features found in systems costing much, much more.

Our nationwide team of over 600 Professional Software/Commodore computer dealers will help you choose the WordPro Plus system that is best for your needs. Our full-service dealers have been set up to provide strong customer support. In addition to helping you choose the right system, many Professional Software dealers also offer WordPro Plus training and system installation.

Professional Software offers a complete spectrum of WordPro word processing software for Commodore computers ranging from the Commodore 64 to the more business oriented 8000/8000 series computers. And WordPro 4 Plus and 5 Plus also interact with our database management systems including InfoPro and The Administrator. So whatever your Word Processing needs, there's a WordPro system that's right for you.

WordPro™ and WordPro Plus™ are trademarks of Professional Software Inc.

The WordPro Plus Series was designed and written by Steve Punter of Pro Micro Software Ltd. Commodore™ and the Commodore 64™ are trademarks of Commodore Electronics, Inc. Dealer Inquiries invited.



Invest In the best...
WordPro Plus. In a class by itself.

Call us today for the name of the WordPro Plus dealer nearest you

Professional Software Inc.

51 Fremont Street
Needham, MA 02194

(617) 444-5224
Telex: 951579

**We just made
owning an Atari computer
a lot more logical.**



Introducing the Rana 1000 disk drive. It's a whole new game for Atari computers.



This two digit LED readout displays a code that tells you everything you need to know.

This switch tells you your write protect feature is keeping your information safe.

The remaining switches provide readouts on density storage, error status, and drive number.

This switch, when you touch it, tells you what track you're on.

When Rana Systems introduced the Elite Series of Apple® compatible disk drives, we didn't know what a tremendous impact they would make. It turned out to be a line so outstanding in performance, styling, capacity, and price, that it instantaneously made us a major force in the market. Well, needless to say, the response was so great that we were forced to create the same highly advanced disk drive for Atari®. A disk drive that when coupled with Atari's computer, could perform everything from accounting, financial planning, and stock charting, to word processing, business management, and letting you write your own programs. Plus, we made it simple enough for a child to use, for learning anything from the alphabet to a foreign language.

Working with a diskette versus playing with a cassette.

Let's face it. The only reason Atari made a cassette option to their computer was to make it affordable. But now you don't have to settle for less. Because now you can get a diskette for your Atari computer which outperforms their cassette. With Atari's cassette you only get half the functions of a computer compared to what our floppy disk can give you. Their cassette is not only limited in the software available, but it also takes 20 times longer to get the information you need. And Rana's disk

drive offers twice the storage capacity of either their cassette or disk drive.

Why even stylewise our new low profile design not only looks 100 times more spectacular, but it occupies 3 times less space. And our new Rana 1000 also gives you a piece of its mind every time you use it, because our disk drive gives you information as well as takes it. And we think that says a lot.

The disk drive that has all the answers.

Rana offers you a myriad of features Atari couldn't even conceive of. Like five electronic functions on the front panel that give you a LED readout when touched. Our disk drive tells you what track you're on, and what density and how much information you're storing. And, we have a write protect feature which protects your diskette from being erased. In fact, no other disk drive can offer you that.

As you can see, it was easy to build a disk drive superior to Atari's. Because for every reason you buy a disk drive, Rana has superior technology.

The Rana 1000 disk drive. It brings your Atari computer to a higher level of sophistication for a price one third lower than Atari's. So your choice shouldn't even be a matter of logic.

Just common sense.

RanaSystems

Always a step ahead.



21366 Superior Street, Chatsworth, CA 91311 213-709-5484. For dealer information call toll free 1-800-421-2257. In California only call 1-800-262-1221. Source Number TCT-654

ATARI® OWNERS

MOSAIC MEMORY™

have made Mosaic #1 because MOSAIC MEMORY gives you the best ways to boost the power of your Atari® computer. That the most advanced programs, games and peripherals designed for the Atari computer will be available for you. With MOSAIC MEMORY you'll have every advantage the Atari computer offers you.

32K RAM

This is the memory board that sets the standard for others. Its compatibility and reliability are legend. Interboard communication with 800.

64K SELECT™

FOR ATARI 400/800

This is the most advanced memory board for the Atari® Computer. Awarded as "one of the most innovative computer products of 1983" at Chicago C.E.S. The SELECT™ gives you 52K RAM, 800 owners with two 16K boards have 96K RAM and can use up to three SELECTS for a 192K RAM total. No other board offers you the computing possibilities that the SELECT™ does.

XL OWNERS — Mosaic Memory available soon. Look forward to Mosaic Memory advancing Atari® XL computers into new worlds.

For your nearest Mosaic™ dealer, call
1-800-2-ADD-RAM (1-800-223-3726)
In Oregon 653-7885

MOSAIC™
ELECTRONICS, INC.

P.O. Box 708 Oregon City, Oregon 97045
ATARI® is a registered trademark of Atari, Inc.
Mosaic is not affiliated with Atari.

48K KIT

FOR ATARI 800
This RAM KIT converts your own Atari® 16K RAM board to a full 48K RAM. Only 5 wires to solder. Complete picture guided instructions.

THE MOSAIC ADAPTER™

WITH THREE 16K BOARDS

800 owners can now open slot three and maintain 48K RAM. The Adapter accepts the chips off of two 16K RAM boards to become a single 32K board. Used with the SELECT™ you'll have 112K RAM!

THE MOSAIC EXPANDER™

FOR ATARI 800
This converts to a 32K RAM board with the chips from one Atari® 16K RAM board. 400 owners will have 32K RAM and 800 owners with two 16K boards will have 48K RAM.

CABLE CONNECTOR PACKAGE #1
FOR ATARI® 400/800. This is the cable connector needed when you buy your first 64K SELECT™. It includes a free software program, SUPER DRIVE, a high speed disk simulator specially written to take advantage of the SELECT™ features. a \$29.95 value

CABLE CONNECTOR PACKAGE #2
FOR ATARI® 800. This cable is required by 800 owners who add additional SELECTS to their Atari®. This will enable the 800 owner to have up to 3 SELECT BOARDS installed for 192K RAM total.

FEATURES

- 24 Telecommunications: How To Get Started Kathy Yakel
 40 Adding Peripherals: Building A Home Computer System Otis Cowper
 46 Choosing The Right TV Michael A. Covington
 50 Guest Commentary: The High Cost Of Personal Telecommunications Robert Brover
 54 Stock Market Analyzer Donald Thompson

EDUCATION AND RECREATION

- 66 Goodbye Charlie Norman Overpeck
 80 Crazy Climber Ted Reynolds
 84 Alpha Blast Dave Miller
 96 Pathway George Fernald
 128 Atari Key Panic John Fackrell
 304 U-boat Mark Vittek

REVIEWS

- 156 AtariSoft's Topo Michael A. Tybanski
 161 Paper Porter Betsy and Sharon Burr
 162 Home Computer Games Grow Up Olson Scott Card
 168 The Times/Sinclair 2040 Printer Seth McEvoy

COLUMNS AND DEPARTMENTS

- 6 The Editor's Notes Robert Lock
 10 Readers' Feedback The Editors and Readers of COMPUTE!
 22 Questions Beginners Ask Tom R. Halliwell
 116 Learning With Computers Glenn M. Kierman
 120 Friends Of The Turtle: Bucky And The Turtle: Exploring The Geometry Of Thinking David D. Thornburg
 134 Computers And Society David D. Thornburg
 140 On The Road With Fred Dignazio: How To Get Intimate With Your Computer, Part 2 Fred Dignazio
 146 The Beginner's Page: Zones Of Unpredictability Richard Marshfield
 150 The World Inside The Computer: How To Get Intimate With Your Computer, Part 1 Fred Dignazio
 207 INSIGHT: Atari Bill Wilkinson
 208 Machine Language Debugging Jim Butterfield
 228 Programming The TI: Answers To Common Questions C. Regina
 233 Micros With The Handicapped Susan Semanick and Marshall Curtis
 237 64 Explorer: The STATUS Variable, Part 2 Larry Truitt

THE JOURNAL

- 174 Commodore Files For Beginners, Part 1 Jim Butterfield
 183 Atari Disk Detective D. G. Denby
 187 64 Sound Tester Ronald V. Picard
 191 How To Improve The TV Quality Of The Commodore 64 Jim Butterfield
 196 String Arrays In Atari BASIC Stephen Levy
 201 Apple Sounds — From Beeps To Music, Part 2 Blaine Matthews
 212 Phone Directory And Dealer For The TI Ken McCann
 215 Modern Save And Download For The VIC-20 Dennis Colombo
 222 Termination For The 64 Gordon C. Lyman
 246 Automatic Variables For Atari PILOT Marvin Roberts
 251 The Commodore Character Set Dan Carmichael
 264 Atari GITA Teletext Matthew Ratcliff
 271 Using The VIC-64 Function Keys Jim Butterfield
 273 All About The TI Character Set Michael A. Covington
 287 Make Your Apple User-Friendly Andrew Ali
 288 Variable Lists E. A. Cottrell
 286 Atari Polycopy Edward Boyer
 289 PEK AND PRINT For The VIC-20 Carolyn D. Bellah
 298 High Octane Transfer For Atari Steve Kaufman

- 313 News & Readers
 326 CAPUTE! Modifications Or Corrections To Previous Articles
 328 A Beginner's Guide To Typing In Programs
 329 How To Type COMPUTE!'s Programs
 330 Product Mail
 336 Advertisers Index

TOLL FREE Subscription Order Line
 800-334-0868 (In NC 919-275-9809)

GUIDE TO ARTICLES
AND PROGRAMS

VIC/AT

VIC/64
 VIC/AT
 AT/NIC/64
 VIC/64P
 AT
 VIC/64

AT/64AP
 TS

AT

TI

64

PW/64

AT
 64
 64
 AT
 AT
 TI
 V
 64
 AT
 VIC/64
 AT
 VIC/64
 64
 AP
 VIC/64
 AT
 V

AP Apple AT Atari, P PET/
 CBM, V VIC-20, C Radio
 Shack Color Computer, 64
 Commodore 64, TS Times/
 Sinclair, TI Texas Instru-
 ments, *All or several of the
 above

NOTE: See page 329
 before typing in
 programs.

COMPUTE! Publications, Inc.
 A subsidiary of American Broadcasting Companies, Inc.

One of the ABC Publishing Companies:
 ABC Publishing, President, Robert G. Suran
 1330 Avenue of the Americas, New York, New York 10020

COMPUTE! The Journal for Personal Computing (USPS 530250) is published 12 times each year by COMPUTE! Publications, Inc., P.O. Box 5436, Greensboro, NC 27403 USA. Phone: (919) 275-9809. Editorial Offices are located at 505 Edwards Drive, Greensboro, NC 27409. Domestic Subscriptions: 12 issues, \$20.00. Send subscription orders or change of address (P.O. form 3579) to Circulation Dept., COMPUTE! Magazine, P.O. Box 5436, Greensboro, NC 27403. Second class postage paid at Greensboro, NC 27403 and additional mailing offices. Entire contents copyright © 1983 by COMPUTE! Publications, Inc. All rights reserved. ISSN 0194-357X.

EDITOR'S NOTES

A recent article in *Business Week* touched on the topic of decelerating sales in the home computer market. Not that sales are declining, mind you; they're just not accelerating with the velocity that many had predicted. One of the recurring questions raised was the value of home computers aside from their use as game machines. If you process words, then obviously a word processing package is of use to you. Perhaps you need a data management program or even a home accounting package. Beyond these uses, what can you do? Or are these uses intrinsically enough?

Our opinion is that there's a bit of a crisis of expectations involved, and perhaps an inch or two of gap between the reality of a basic system and the advertisements describing a fully configured system. It is, in fact, quite frustrating to discover that a home computer may cost you \$99, but the memory expansion, disk drives, and so on to go with it — which turn it into a far more practical system — may cost you an additional \$1,000. And that's before you buy that word processor or data manager software.

In most consumer market items there's far more parity of pricing, given that one rarely expects to pay more for a lens than a camera; more for a record than a player. In the home computer market, especially the low end, this pricing parity expectation is even more greatly exaggerated. There's not very much you can add to your computer that doesn't cost more than the computer did.

We suggest that this simple mismatch may have a great deal to do with perceptions of machines such as the Timex/Sinclair which has recently been falling off in sales. And these aren't sales that are necessarily being lost to other market leaders. The industry is simply not expanding at the rate many expected.

Perhaps bundling (selling a combination of home computer, peripherals, and software) will provide an answer. We'll be closely watching the success of Adam, and an expected bundled Commodore 64 package, to see what the market decides.

Random Bits: Where is *Baby*

Blue? As all the industry speculates on the arrival of the IBM Home Computer (frequently called Peanut), other industry stocks are being buffeted by the rumors and speculation about this long-pending announcement. One important point to remember is that there are literally thousands of computers being sold each day, and the market is truly growing.

Commodore 1541 disk drives are in short supply, and a rumor exists for every possible reason. While some have suggested that a recall has quietly taken place, it appears to us that the shortage that Commodore predicted several months ago is actually upon us. This shortage has been complicated by an apparent high rate of problems with the drives, causing excessive downtime and consumer complaints.



Editor In Chief

T&F
SOFTWARE

Two Hot New Action Games!

FOR COMMODORE 64

Speed Racer

\$29.95



Feel like a devil today? Better adjust your halo. Start the ignition. It's up to you to decide... Okay, hit the accelerator. You can be the ultimate speed demon or put wings on your wheels! There's a pedestrian now... will you go for speed, no matter what pedestrians are in the way (for the devilish points)—or be an angel in a challenging obstacle course? The heavenly points may get you to heaven, but the devilish points may get you to... well, better make your decision—the time clock is running!

Candy Bandit

\$29.95



So your sweet tooth has gotten out of hand again? Well, this time the sheriff is after you and he's no sweetheart. There he is now! Quick! Grab all the candy in sight and dive for the doorway! Don't look now, the doors are rotating... better be good at getting out of sticky situations, 'cause if you hit the wall you're stuck with it! There's plenty of candy here and many more levels to cross, so get on the move, sugar!

**Available at finer Software
Stores everywhere.**

OR CALL (213) 501-5845 FOR THE NAME OF YOUR
LOCAL DEALER OR DISTRIBUTOR.

T&F
SOFTWARE

T&F Software Company 10902 Riverside Drive / North Hollywood, California 91602. (213) 501-5845

* COPYRIGHT 1983 CHRIS WARLING. SPEED RACER AND CANDY BANDIT ARE TRADEMARKS OF CHRIS WARLING LICENSED TO T&F SOFTWARE. COMMODORE 64® IS A REGISTERED TRADEMARK OF COMMODORE COMPUTER, INC.

Publisher
Editor in Chief
Business Assistant
Service Editor
Managing Editor
Assistant Managing Editor
Production Editor
Features Editor
Technical Editor
Program Editor
Assistant Editors

Gary L. Ingerson
 Robert C. Lock
 James S. Wiles
 Richard W. Ward
 Kathleen E. Motterick
 Tony Roberts
 Garth Kiebler
 Tom R. Hallen
 Otis R. Cowper
 Charles Brownson
 Dan Carmichael
 Lorice Siro
 Judith Holmes
 Kathy Kieker
 Patrick Parikh
 Gregg Pease
 Dale McBride
 Vicki Jennings
 Laura MacGibbon
 Jeff Harkin

Copy Assistants

Becky Hall
 Linda Shaw
 Martha Banks
 Jim Butterfield
 Toronto, Canada
 Harvey Herman
 Greensboro, NC
 Fred Dignazio
 297 Carter Road S.W. Roanoke, VA 24015
 David Thompson
 P.O. Box 1317, Los Altos, CA 94022
 Bill Wilkerson

Associate Editors

Contributing Editor

COMPUTE! Book Division

Editor

Assistant Editor

Artists

Art Director/Production Manager

Assistant

Mechanical Art Supervisor

Artists

Typesetting

Illustrator

Production Assistant

Associate Publisher/National

Advertising Sales Manager

Advertising Coordinator

Advertising Accounts

Sales Assistant

Operational/Customer

Service Manager

Customer Representatives

Dealer Coordinator

Assistant

Individual Order Supervisor

Assistant

Operations

Shipping & Receiving

Data Processing Manager

Assistant

Accounting Manager

Controller

Accounting Assistant

Assistants

Robert C. Lock, Chief Executive Officer

Gary L. Ingerson, President

W. Jerry Day, Vice President of Finance

James M. Hurd, Controller

Doris Nash, Executive Assistant

Carol Dickinson, Assistant

Coming in December

Special Home Applications Issue
The Home Office, Paycheck Analysis, And Energy Bill Audit

Exciting Games For Several Computers—Chopperoids, Nightflyer, And Space Thief

VIC And 64 Disk Utility

Atari Charmaker

T1 Word Processing Program

COMPUTE! Publications, Inc. publishes

COMPUTE!

COMPUTE! Books

Telephone: 919-275-9809

Subscription Information
COMPUTE! Circulation Dept.
P.O. Box 5406
Greensboro, NC 27403

TOLL FREE Subscription Order Line
800-334-0868
 in NC 919-275-9809

COMPUTE! Subscription Rates
(12 Issue Year):

US	(one yr) \$20 (two yrs) \$36 (three yrs) \$54	Europe, Australia \$38 Middle East, Central America and North Africa \$48 South America, South Africa, Far East \$68
Canada and Foreign Surface Mail	\$25	

Advertising Sales



Phoebe Thompson and Associates
 101 Church Street
 Suite 13
 Los Gatos, CA 95030
PHOEBE THOMPSON

The Giffelman Company
 Statter Office Building
 Suite 518
 20 Providence Street
 Boston, MA 02115
 AL DATTCH
 RUTH WILLIAMS

The Giffelman Company
 Summit Office Center
 7266 Summit Avenue
 Fort Washington, PA 19034
 SHARON BRODIE
 JOE PORTER
 MIKE STANLEY

GB & Associates
 P.O. Box 335
 Libertyville, IL 60048
 GORDON BENSON

COMPUTE! Home Office
 505 Edwards Drive
 Greensboro, NC 27409
 HARRY BLAIR
 Southwestern Sales Representative

Address all advertising materials to:
 Ruth Williams
 Advertising Production Coordinator
COMPUTE! Magazine
 505 Edwards Drive
 Greensboro, NC 27409

The COMPUTE! subscriber list is made available to carefully screened organizations with a product or service which may be of interest to our readers. If you prefer not to receive such mailings, please send an e-mail copy of your subscription label to COMPUTE!, P.O. Box 544, Farmington, NH 03043. Include a note indicating your preference to receive only your subscription.

Authors of manuscripts warrant that all materials submitted to COMPUTE! are original materials with full ownership rights resident in said authors. By submitting articles to COMPUTE! authors acknowledge that such materials, upon acceptance for publication, become the exclusive property of COMPUTE! Publications, Inc. No portion of this magazine may be reproduced in any form without written permission from the publisher. Brief contents copyright © 1983, COMPUTE! Publications, Inc. Rights for full content in COMPUTE! will be returned if authors are required to sign an author contract. Unpublished materials not accepted for publication and (lowercase, please) with double spacing. Each page of your article should bear the title of the article, only name of the author. COMPUTE! assumes no liability for errors in articles or advertisements. Copyright reserved by authors or not necessarily those of COMPUTE!

IBM, IBM PC, and IBM compatible are trademarks of International Business Machines Corporation.
 Apple is a trademark of Apple Computer Company.

Atari is a trademark of Atari, Inc.
 Tandy is a trademark of Tandy Corporation.
 Radio Shack Color Computer is a trademark of Tandy Inc.



WordPro 3 Plus/64™

The Best Word Processor for your Commodore 64™

Now
available
for as low as
\$89.95



When choosing a Word Processor for your Commodore 64 computer, there's no reason to settle for anything but the best—in a word... WordPro™.

With over 30,000 happy WordPro clients churning out letters and documents all over the world, the WordPro Plus™ Series is unquestionably the #1 selling software package on Commodore computers! So when you choose WordPro, you know you're investing in a trial-tested program that's a real winner. And WordPro 3 Plus/64 is NOW available for your Commodore 64 computer at prices as low as \$89.95.

Designed for the novice user with no computer or word processing experience whatsoever, WordPro 3 Plus/64 brings a whole new dimension to the term "user-friendly." More than just easy to use, WordPro 3 Plus/64 is a commercial level word processor loaded with powerful features including: Auto Page Numbering,

Headers and Footers, Math Functions, Global Search and Replace, the Ability to Create Multiple Personalized Letters and Documents, Underlining, Boldface, Super and Subscripts and much, much, more.

Best of all, WordPro 3 Plus/64's powerful arsenal of features can be put to use almost immediately—by even the novice user. So whether you're a writer, in business, education, or just a hobbyist, you'll quickly become a WordPro Pro!

Invest in the best... WordPro Plus. In a class by itself.

Call us today for the name of the WordPro 3 Plus/64 dealer nearest you.

Professional Software Inc.

51 Fremont Street
Needham, MA 02194

(617) 444-5224
Telex: 951579

WordPro 3 Plus/64™ is a trademark of Professional Software Inc.

The WordPro Plus Series was designed and written by Steve Punter of Pro-Micro Software Ltd.

Some printers may not support certain WordPro 3 Plus/64 functions and/or require an interface. Please check with your dealer.

Commodore 64™ is a trademark of Commodore Electronics Ltd.

Dealer and Distributor inquiries are invited.

READERS' FEEDBACK

The Editors and Readers of COMPUTE!

Tone Generator For The VIC

I own a VIC-20 and I am very pleased with it. However, I would like to know if it's possible to add a tone generator so that when I hit a key on the keyboard a tone is heard to indicate that an entry was made. I've seen this on other computers and find it most useful.

Kevin M. Regenhard

The positive stroke keyboard tone generator you mention is not built into the VIC-20. However, it is possible to program this useful function into your VIC.

Type in, SAVE, and then RUN the following short BASIC loader which will POKE in a machine language program. The program is written to run in the cassette buffer, so it shouldn't interfere with your BASIC programming memory. Once the program is POKEd into memory, SYS828 to start, and press RUN/STOP - RESTORE to stop.

```
60000 FOR A=828 TO 861: READ S: POKE A,B:
      NEXT: END
60010 DATA 169,15,141,14,144,120,169,78,14
      1,20,3,169,3,141,21,3,88,96
60015 DATA 165,197,201,128,240
60020 DATA 7,101,197,105,128,141,12,144,76
      ,191,234
```

The Atari Mystery Connection

I took apart the Atari 400 and noticed on the back of the main board chip that there is a connection not in use. What is this connection for and why is it not in use?

Ki Jeong Yun

This connection, also found on the Atari 800, is used by Atari to test the machines on the assembly line. Due to its inaccessibility, it has never had any other use, although it could possibly be used for expansion.

Double-spaced Listings On Commodore Printers

I have a Commodore 64 and a Commodore 1525E printer. There are many occasions while I'm debugging a new program when a double-spaced paper listing would provide a lot more room to make corrections and additions.

Is there a way to force the LIST command to

double-space on the printer without modifying the program being listed? Perhaps Jim Butterfield could suggest a short machine language routine.

Stephen D. Eitelman

Yes, it is possible to command the printer to double-space during the LIST command. In fact, all Commodore printers and many other printers have this ability. You will also, of course, see double-spaced listings on your screen. With any Commodore printer, you can enter and run one of these short BASIC programs, which will POKE a machine language program into the cassette buffer to create double-spacing.

```
5 AD = PEEK(55)+PEEK(56)*256-20
10 I=AD
15 POKE 55,AD AND 255 : POKE 56,AD/256
20 READ A:IF A=256 THEN END
25 IF A=-1 THEN A=(AD+11) AND 255
26 IF A=-2 THEN A=(AD+11)/256
30 POKE I,A:I=I+1:GOTO 20
35 PRINT"[CLR]RUN WITH : {REB}SYS"AD
40 CLR
828 DATA 169,-1,141,38,3
834 DATA 169,-2,141,39,3
840 DATA 96,201,13,208,5
846 DATA 32,122,242,169,13
852 DATA 76,122,242,256

5 PRINT"[CLR]RUN WITH SYS 679"
10 I=679
20 READ A:IF A=256 THEN END
30 POKE I,A:I=I+1:GOTO 20
679 DATA 169,178,141,38,3,169,2
687 DATA 141,39,3,96,201,13,208
695 DATA 5,32,202,241,169,13,76
703 DATA 202,241,256
```

TI Free Memory Techniques

I would like to clarify and expand upon the ideas expressed by Howard Patlik in "More on TI Memory" (Readers' Feedback, August 1983). This two-line program for determining free memory on the TI-99/4A was offered:

```
1 A=A+8
2 GOSUB 1
```

If you RUN this program alone and PRINT the variable A, you will find the amount of available memory less the 37 bytes required by the program itself. (A equals 14536, so A plus 37 equals 14573 bytes of memory for programming.) When the program RUNs, the GOSUB in line 2 will ex-

**Presenting
the class
of 64.**



The Commodore 64™ is one of the most exciting home computers in memory.

But memory isn't the only thing that's exciting about the 64. Because Tronix is here.

Class act.

The people who have been bringing out the best in the VIC 20™ (and Atari®, too) have graduated to the Commodore 64.

Which means that now you can enjoy fast action, complex strategies, interesting characters, superior sound effects and challenging, play patterns.

Just like VIC 20 and Atari owners. Only faster, more complex, and more challenging, too.

More memorable, in other words.

In a class by ourselves.

Of course, if you'd rather not take our word for it, you don't have to. The experts at Electronic Games have called *Kid Grid* for Atari "one of the most compulsive, utterly addictive contests in the world of computer gaming."

They haven't seen anything yet.



By Art
Haroulurian

Edison, the kinetic android, leads a frustrating life.

All he wants to do is build his circuit boards and go with the flow. But things keep getting in the way.

Nohms—a negative influence—bug him constantly. Flash, the lightning bolt, disconnects everything in his path.

And the cunning Killerwatt is out to fry poor Edison's brains.

You'll get a charge out of this one. And a few jolts, too!

(Suggested retail \$34.95)



By Art
Heroutunian

Connecting the dots on our colorful grid should be easy, right?

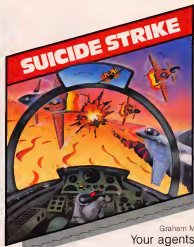
Wrong. Because the bullies are in hot pursuit!

Squashface, Thuggy, Muggy and Moose are their names. And you are their game. And what's more, they're faster than you are.

But you're smarter. And you control the stun button.

So keep your eyes peeled for the mysterious question mark and don't slow down at corners!

(Suggested retail: \$34.95)



By
Graham McKay

Your agents

risked their lives

to find the enemy's secret headquarters.

Now you're risking yours to destroy it.

And they know you're coming.

As you fly over water and across hundreds of miles of unfriendly territory, the action is thick, fast and three-dimensional.

Fighter aircraft. Surface-to-air missiles. Helicopter gunships. The attacks come from every direction.

Even from behind.

(Suggested retail: \$34.95)

ATARI™

8295 South La Cienega Blvd., Inglewood, CA 90301

VIC 20™ and Commodore 64™ are trademarks of Commodore Electronics Ltd.
Atari™ is a registered trademark of Atari, Inc.

ecute 1817 times before a MEMORY FULL error is issued in line 1. Each time this GOSUB executes, 8 bytes of memory are consumed and thus 1817 times 8 is 14536. As many as 7 bytes may still be unused.

Of course, if this two-line routine is entered with a program already in memory (providing the variable A is not used within this program), you will find the amount of free memory less 37 bytes when you RUN and PRINT A.

There are some more considerations. String variables and graphic characters defined above CHR\$(127) will require additional memory that this two-line routine will not pick up. The TI-99/4 has 256 more free bytes than the TI-99/4A, but if graphic characters above 127 are used, then both will use the same amount of memory.

Screen and BASIC overhead is 1792 bytes. And if all or only the graphics character 159 is used, then overhead is 2048 bytes (1792 + 8* (159-127)). The 16K TI-99/4A is, of course, actually 16,384 bytes. So, 16,384 minus 1792 is 14,592 bytes free. (There is a slight discrepancy from the two-line method of up to 19 bytes.)

Here is another way to find memory size using CALL PEEK. For TI BASIC, you need the Mini Memory or the Editor/Assembler cartridges. Type in CALL PEEK(-31974,A,B). Again the variables A and B should not be in the program. Then PRINT A*256 + B-1776. With no program present, this will give a size of 14577 bytes free.

To check this with TI Extended BASIC (Version 110), type PRINT A*256 + B-2455. The TI's response is 13886. Now type SIZE. The TI responds with 13886 BYTES FREE.

Another user of memory in TI BASIC is Terminal Emulator II. It takes about 512 bytes. It is also well-known that the disk controller uses console memory. Even after ENTERing CALL FILES(1) and the NEW command, it still uses 1052 bytes. Here's how to free up this memory. Type CALL LOAD(-31888,63,255) and NEW.

Again, in TI BASIC the Mini Memory or Editor/Assembler cartridge is needed, but in TI Extended BASIC, the 32K Expansion is needed. To restore disk drive(s) and disk controller, use the command BYE or FCTN QUIT.

Paul E. Schipnick

Atari Upgrade Update

We have recently heard from several factory authorized Atari service center representatives who tell us that there is an inexpensive (under \$30) upgrade for the 10K ROM operating system. The original operating system of the 400/800 had a number of minor errors (bugs), and the Revision B operating system corrected these problems. This is the first time to our knowledge that Atari has offered this upgrade. To check which operating

system you have, enter: PRINT PEEK(58383). If you get a 56, you may want to visit your nearest service center and get the upgrade (a value of 0 returned means you already have Revision B).

Another Perfect Commodore INPUT

In the last several issues I have seen a number of "Perfect INPUTS" to avoid Commodore's return to READY from input. All of these methods work. In my opinion, however, since you can continue from READY by entering CONT on a clear line, their disadvantages outweigh their advantages.

I have another way of avoiding this problem. It uses the standard INPUT statement and CBM's active screen. When an input statement is executed, CBM BASIC prints a ? at the current cursor position, then moves the cursor to the right one additional space. All of the positions to the right of the cursor are automatically allocated for inputting data (up to 80 characters). By printing some default value into this area before executing the input statement, not only do you avoid the return to READY, but you also allow for inputting default values by just hitting RETURN.

For example:

```
10 VA = 10 : REM SET DEFAULT VALUE TO 0
20 PRINT "WHAT IS THE NEW VALUE": PRINT
   " "; VA;"(UP)"
30 INPUT VA
40 PRINT "THE CURRENT VALUE IS": VA
50 INPUT "IS THE VALUE CORRECT (Y/N)
   {3 SPACES}Y{3 LEFT}": A$
60 PRINT "WHAT IS THE VALUE": TAB(20);"D
   DEFAULT VALUE"
70 PRINT TAB(18);"(UP)";
80 INPUT DV$
```

This appears on the screen as:

```
WHAT IS THE NEW VALUE
? 10
THE CURRENT VALUE IS 10
IS THE VALUE CORRECT (Y/N)? Y
WHAT IS THE VALUE? DEFAULT VALUE
```

The flashing cursor is positioned over the 1, Y, and D respectively.

By hitting only the RETURN key (3 times), you INPUT 10 to VA, Y to A\$, and DEFAULT VALUE to DV\$. If you want some other value, you need only type it in before hitting RETURN.

By taking a little time in choosing default values when writing a program, you can save a lot of time when running it and entering data.

Dennis D. Duke

Atari Listings

How can hard copy be printed from RAM memory which has been loaded from a user-made BASIC program on a cassette? I realize that this is not too difficult a problem, but I have not found a solution



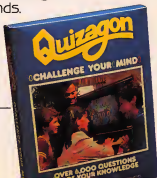
Using Your Brain Is Fun When You're Playing Quizagon!

Knowledge, strategy, luck...all are part of mastering this exciting, new type of game!

Over 6,000 questions explore and expand what you know about science, sports, entertainment and potpourri.

It's a family game. It's a party game. It's a game for people who want to challenge their minds.

Available for the IBM PC, Apple II, Commodore 64, and VIC-20 computers
For the name of your nearest dealer call 800-328-1225



counterpoint software, inc.

4005 west sixty-fifth street • minneapolis, mn 55435
(612) 926-7888 • (800) 328-1223

in either your Atari books or in the issues I have of COMPUTE!

David Cimochowski

If we understand your question, you want to print out a listing of a BASIC program in memory. Use the command LIST "P:" for this purpose. You can also use the following program to copy any data file (not programs) to your printer.

```
100 OPEN #1,4,0,"C:";REM Use OPEN #1
    ,4,0,"D:name" for disk
110 OPEN #2,B,0,"P:";REM Output to p
    rinter
120 TRAP 140:REM Go to 140 when end
    of file error occurs
130 GET #1,A:PUT #2,A:GOTO 130
140 PRINT #2:CLOSE #1:CLOSE #2
150 END
```

Mode Shifting And Automatic Tape RUN For Commodore

I seem to remember reading of a POKE that allows the use of upper- and lowercase with the use of the shift key, but can't find it in the *Programmer's Reference Guide*, the *VIC-20 User's Manual*, or *COMPUTE!'s First Book of VIC*. Could you tell me what this POKE is? Also, how do I make my taped programs run after being LOADED without my intervention?

Tim S. Hallen

There are a number of ways that you can place the VIC-20 or the Commodore 64 into the upper/lowercase or "text" mode. Using a POKE, the locations are 36869 on the VIC, and 53272 on the 64. These locations are on the VIC (Video Interface Chip) chip of each machine, and tell the computer where to get its character set. On the VIC, the normal value is 240, and on the 64 it's 21. To place the VIC into the text mode, POKE 36869,242 and for the 64, POKE 53272,23. To return to uppercase/full graphics (normal) mode, POKE 36869,240 on the VIC, and POKE 53272,21 on the 64.

There are other methods which switch between text and normal modes. One of these is to hold down the COMMODORE and SHIFT keys. To switch to text mode, press and continue to hold the COMMODORE key while pressing the SHIFT key. To return to normal, simply toggle the keys again. Another method, and probably the safest and most efficient, is via the PRINT command. To switch to text mode, type PRINT CHR\$(14) then press RETURN. To return to normal mode, type PRINT CHR\$(142). These PRINT statements can also be used within a program if you wish.

There are a number of ways to make the computer automatically run your programs after LOADING. The easiest is via the keys on the keyboard. After positioning your tape cassette to the beginning of the program you wish to LOAD and RUN, press and continue to hold the SHIFT key, then press the RUN/STOP key. This will LOAD your program into memory, then run it

without your having to type and enter RUN.

Another method is to "string load" your cassette programs. String LOADING programs is LOADING and RUNNING one program which in turn LOADs and RUNs the next program on the cassette tape. To accomplish this, LOAD and RUN your first program normally, and use the last statement of this program to call in the second program with a LOAD command. For instance, the last line of the program would read: 60000 LOAD "filename". When the program encounters this statement, it will automatically LOAD and RUN the next program on the cassette tape. This can also be a very useful programming technique for saving memory if, for example, you have a program that has a long list of instructions for the user to read before running the program. You can use the first program in the "string" to display the instructions and then load in the second program when the user is finished reading.

Use Any Tape Recorder With Atari?

I am a new owner of an Atari 800. I eventually plan to purchase a disk drive, but as a temporary storage device, I would like to use my Panasonic cassette recorder, rather than purchase an Atari 410 or 1010 program recorder. Is this possible? If so, how do I go about wiring connections without causing any damage to the computer?

Mark Inman

The serial plug used to connect Atari peripherals has connections for audio out and audio in. You can attach a standard recorder to audio out and record CSAVES, but there is no way to get the computer to read the audio in line (which is used to play the audio track through the TV speaker). The Atari 410 recorder has a special analog to digital circuit used to translate tape tones into digital information that the computer can read.

Text On The Apple High-Resolution Screen

My family has just purchased an Apple II+ computer. I can program graphics on the high-resolution screen, but things just aren't the same without text somewhere besides the text window at the bottom of the screen. Is it possible to put text on the high-resolution graphics screen?

Mark Hayek

You can put shapes that look like text on the Apple's high-resolution graphics screen by using the program "HRCCG" (high-resolution character generator) that comes on the DOS Tool Kit disk. This program can be accessed from a BASIC program and will load shape tables representing different character sets into memory just below DOS.

Normally, these shape tables will produce the standard ASCII characters on the high-resolution screen. However, there are other character sets on the Tool Kit

Have You Read The Reviews On Our New AtariWriter™?

Antic
The **ATARI** Resource
MAY 1985, VOLUME 2 NUMBER 2

AtariWriter is the best non-game
program Atari has released. The

NUMBER 11

ANALOG COMPUTING
THE MAGAZINE FOR THE COMPUTER OWNERS

Advanced Features.
ATARI has a hit on their hands.

BACKUP PROGRAMS REVIEWED!
MOVING

Atari's New Word Processor.

Try it, be your own critic. Use new AtariWriter for all your family correspondence, school papers, committee reports, mailings.

Our advanced ROM-based cartridge technology means you can use it on any ATARI Home Computer (even 16K). It also lets you choose between cassette and disk storage systems.

Easy to learn and to use. "Yet," says ANALOG Magazine, "as your uses for word processing grow, (you'll employ) its more advanced features."

Menu driven, with helpful prompts.

One special feature: you can correct as you write, instantly, without switching back and forth between Create and Edit modes.

You can move entire paragraphs. Search and replace. Even restore text you've just deleted, with our memory buffer.

You can change format instantly, and preview on-screen at full printer width. Print extra copies for your records.

As ANTIC Magazine concluded, new AtariWriter is "clearly superior on price and performance to 'Text Wizard and the ATARI Word Processor.'" At Atari dealers.

ATARI® HOME COMPUTERS

 A Warner Communications Company. © 1985 Atari, Inc. All rights reserved.



SPINNAKER'S LINE OF EARLY LEARNING GAMES IS GROWING AS FAST AS YOUR CHILD'S MIND.

Watching your kids grow up is a lot of fun. But making sure their minds grow as fast as their bodies is even more rewarding. That's where we can help. With a growing line of Early Learning Programs that are not only lots of fun to play, but also educational.

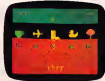
Some of the games you see on these two pages help exercise your child's creativity. Others help improve vocabulary and spelling skills. While others

improve your child's writing and reading abilities. And all of them help your child understand how to use the computer.

So if you're looking for computer programs that do more than just "babysit" for your kids, read on. You'll find that our Early Learning Programs are not only compatible with Apple® Atari® IBM® and Commodore 64™ computers, but also with kids who like to have fun.



KIDS ON KEYS™ helps kids catch on to letters, numbers – and computers. Ages 3-9.



KIDS ON KEYS is a great way to introduce kids to the computer keyboard. Because it offers children three terrific games that teach them the location of the letters and numbers

while they have fun with the computer.

The games are fast and fun, with exciting sound effects and colorful graphics. It's a great way for kids to enjoy learning to identify numbers, letters, and words and associating them with images on the screen. And **KIDS ON KEYS** certainly do have fun!



DELTA DRAWING.™ Have fun creating pictures and computer programs. Ages 4-Adult.

Kids love to draw. And DELTA DRAWING Learning Program lets them enjoy creative drawing and coloring while they learn computer programming concepts. As they use simple commands to put lines and colors in



their drawings, they're actually writing computer programs!

With DELTA DRAWING, even kids who have never used a computer before can learn to do simple programming and build an understanding of procedural thinking. It's easy, clear, and lots of fun!

A trip through ALPHABET ZOO.™ Ages 3-8

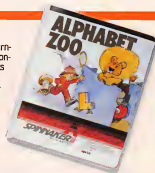
It's a race. It's a chase. It's Alphabet Zoo, the exciting game that will have your kids zipping through the maze, after letters that fit the picture on the screen.

And at the same time, your



kids will be learning the relationship of letters and sounds, and sharpening their spelling skills.

So they'll be laughing and learning at every turn.



The story of STORY MACHINE.™ Ages 5 to 9.

STORY MACHINE is like a storybook come to life. Using the keyboard, your children write their own fun little stories. The computer then takes what they've written and animates their story on the screen, com-



plete with full color graphics and sound.

STORY MACHINE helps your children learn to write correctly, become familiar with the keyboard, and lets them have fun exer-

cising their creativity at the same time.



Delta for: Apple, Atari, IBM, Commodore 64,
Cartidges for: Atari, Commodore 64

disk which can be substituted for the ASCII set. If you like, you can even define your own character set using the program "Animatrix," also on this disk. This method was employed in the Apple version of the game "Goblin," which appeared in the July 1983 issue of *COMPUTE!*. Consult the booklet which accompanies the Tool Kit disk for details on these techniques.

Programming The Commodore Joystick

I own a Commodore VIC-20. I have learned how to program games, but I have not learned how to program the games to respond to a joystick.

I have looked in the *VIC-20 Programmer's Reference Guide*, but I did not understand the information. I would like to know how to program games to respond to a joystick. Would you please explain this to me?

Mitchell Kerman

In both the VIC-20 and the Commodore 64, the joystick is programmed by PEEKing two bytes.

The VIC is designed to handle only one joystick, and it takes two bytes to control that joystick. In the VIC, location 37137 is PEEKed to read the joystick for the up, down, left, and fire button movements. Location 37152 is PEEKed to detect movements to the right.

The 64 is designed to handle two joysticks, and unlike the VIC, each joystick is controlled with one byte. To detect the position of a joystick plugged into port A, PEEK 56320, and for port B, PEEK 56321 is used.

To see just how easy it is to detect movement on the joystick, plug in your joystick, type in one of the following short programs, and then RUN. The programs simply PEEK the joystick control bytes, and then PRINT that reading to the screen.

For the VIC-20:

```
10 PRINT PEEK(37137),PEEK(37152):GOTO 10
```

For the Commodore 64:

```
10 PRINT PEEK(56320),PEEK(56321):GOTO 10
```

As you run the programs and play with the joystick, you'll see the values printed to the screen change as the values in the joystick ports change. You can program the joystick into your games by PEEKing these locations, and using IF...THEN statements in your program to process the information.

A quick word about programming techniques here. Because the joystick control bytes are often shared (that is, they do other things besides read the joysticks), it is more efficient to PEEK only the affected bits in the joystick control bytes. This will filter out other information not connected to the joystick. This is done by ANDing your PEEKs. For more information on which bit is used for each joystick application, consult the *Programmer's Reference Guide* for your specific computer.

Saving Machine Language Programs

I'd like to protect programs I write on my VIC-20, and I know that using machine language accomplishes this. But how do you save machine language on tape?

Dave Karlson

The easiest, quickest, and most efficient way to save a machine language program is from within a machine language monitor. There are many monitor/assembler packages available for your VIC-20, among them "TINYMON1," published in *COMPUTE!'s* First Book Of VIC, and the VICMON Machine Language Monitor Cartridge available at your local Commodore dealer. The following technique will also work successfully on the Commodore 64.

Once a monitor is loaded and running, the usual format for saving to cassette tape is: S "name", XXXX, YYYY, 01 where S = save, name = name of program, XXXX = starting address of the machine language program to be saved, YYYY = ending address of the program, and 01 is the device number (tape). Saving to disk would use the same format, except that the device number would be 08 (disk). However, it should be noted that some monitor/assemblers use a different format. See the accompanying documentation.

There is another way to save machine language programs, but it involves some redefining of the VIC's operating system. You can save a machine language program in the same manner that you would a BASIC program. To accomplish this, you have to redefine, or POKE three sets of pointers. First, you have to determine the beginning and the ending addresses of the machine language program. Once this is known, POKE 43 and 44 (start of BASIC pointer) to point to the beginning of the program, POKE 45 and 46 (start of BASIC variables, or end of BASIC pointer) to point about 10 bytes past the end of the program, and POKE 55 and 56 (highest address used by BASIC) to point about 30 bytes past the end of the program. Next type CLR. Now you are ready to save to tape or disk in the normal manner, i.e., "SAVE filename, 1" (for tape) or "SAVE filename, 8" (disk).

To LOAD the programs back into memory, use the standard format for LOADING machine language programs: LOAD filename, device number, 1. For example, LOAD "filename", 8, 1.

COMPUTE! welcomes questions, comments, or solutions to issues raised in this column. Write to: Readers' Feedback, COMPUTE! Magazine, P.O. Box 5406, Greensboro, NC 27403. COMPUTE! reserves the right to edit or abridge published letters.



Introducing a computer game that will bring out the railroad buff, the tycoon, the adventurer, and the kid in your kid.

TRAINS is one computer game that will really bring out the best in kids. Of all ages.

Because TRAINS is a Spinnaker game, which means it's a learning game that's really fun to play.

TRAINS puts kids in charge of an old-time railroad. And whether their railway empire gets bigger or goes out of business is entirely up to them.

As they juggle the challenges of picking up supplies and delivering to various industries, paying their employees, keeping the locomotive filled with coal, and making enough money to venture into new territories, kids are actually

learning the economics of running a business.

They're learning to manage financial resources, and to use different kinds of information in setting priorities.

And best of all, they're having fun while they learn.

Look for TRAINS on disk at your

local software retailer, and play it on your Apple® Atari® or Commodore 64® computer.



SPINNAKER
We make learning fun.™

Questions Beginners Ask

Tom R. Halfhill, Features Editor

Are you thinking about buying a computer for the first time, but don't know anything about computers? Or maybe you just purchased a computer and are still a bit baffled. Each month, COMPUTE! will tackle the questions most often asked by beginners.

Q I have recently purchased a computer with a cassette recorder. In a recent issue of COMPUTE!, an author stated, "Remember that the safest way to make sure that your program is not lost forever is to save it at least every half an hour that you work on it." Does this mean that, when typing in the extra long programs, you should stop half an hour into the program and save it, then continue typing from that point on?

A To be safe, yes. You might want to stop and save the program even more often, or less often – depending upon how much of your work you are willing to reconstruct in the event of a disaster.

Remember that programs loaded from disk or tape, or typed on the keyboard, are kept by the computer in Random Access Memory (RAM). RAM holds this information only while the computer's power is on. If you are typing in a long program and a thunderstorm suddenly knocks out the electricity, or if someone kicks loose the power cord, all your work will be lost. You would have to start over again from the beginning.

That's why most people "safely save" the program they are typing or writing. Admittedly, if you are working with a cassette recorder instead of a disk drive, this can be inconvenient because of the waiting involved. A very long program might take ten minutes to save. If you save your work every half-hour, you could spend one-third of your time waiting for the recorder.

A good compromise might be to save to tape once every hour. Decide for yourself: If there are no storms brewing, if the power cords are safely hidden from passing feet and pets, and if no one else is around to accidentally turn off your computer, you can probably get away with saving your work less often than someone who must put up with such hazards.

Q I own an Atari 800 (48K) with a 410 Program Recorder and my brother owns an Atari 400 (16K) and a 410 also. Is there any way to interface

the two computers in order to play a program through both at the same time?

A It is possible to hook up two (or more) computers to share a program – even two computers which are normally incompatible – but there are several complications involved.

First, you would have to buy or make a cable to hook the two computers together. One way would be to use the parallel or serial ports on a pair of 850 Interface Modules, or the built-in serial bus on each computer (although the latter method would interfere with access to peripherals, such as your cassette recorders). I know of no cables for this purpose, and making one would be a task for a knowledgeable technician.

Perhaps using a pair of modems would be the easiest way to hook up the computers. Each computer would require its own modem and telephone. You would call up your brother's computer and link them together over the phone lines. Of course, this would also require the proper terminal software – a program to allow each computer to act as a remote terminal, communicating with the other. Whatever you typed on your computer would appear on your brother's screen, and vice versa. In effect, you would be "sharing" a program on both computers – the terminal program.

But to do anything more would require a special program to take the place of the terminal software. You don't mention in your letter what type of program you want to share on both computers. There are only a few programs designed for this. If you want to play an interactive game – with you and your brother making moves and countermoves from your own computers – you'd need a game program specially designed for this. The only one I've heard of is *Combat* by Adventure International. This is an interactive tank battle game with simple graphics that can be played over the phone lines between even normally incompatible computers, such as a Radio Shack TRS-80 and an Atari.

Be aware, however, that such games are limited by the speed of data transmission over the phone lines. It is very difficult to program fast action and flashy graphics. For more information, see "Telegames: Computer Games By Phone," in last month's COMPUTE!, and "Telecommunications: How To Get Started," elsewhere in this issue.

Now developing a child's mind can be fun for the whole family.



Developing a child's mind is serious business. But with Spinnaker's Family Learning Games, helping a child learn new skills and concepts

is fun for everyone in the family.

Take **UP FOR GRABS**.™ It's a fast-paced crossword game that will keep parents and kids on their toes. Quick—grab the letters you need off the rotating cube before someone else does! Place them in your playing area and build words fast for points. It's challenging, it's exciting, and it's actually helping your children develop their vocabulary and spelling skills.

Then there's **FRACTION FEVER**.™ It's got arcade action! Hop along on your pogo stick and find the right fractions, zap the wrong ones, look out for holes in the floor, and keep a close eye on the clock. Everyone in the family will want a turn—and it's a great way for kids to learn what fractions are and how they relate to each other.

And don't forget **COSMIC LIFE**™—an arcade-type game where you populate a planet using strategy, speed, and your ability to make quick decisions.

Find Spinnaker Family Learning Game cartridges at your local software retailer, and play them on your Atari® or Commodore 64™ home computer. And make learning fun for the whole family!



SPINNAKER™
We make learning fun.

TELECOMMUNICATIONS: How To Get Started

Kathy Yakal, Editorial Assistant

More and more people are using their personal computers to communicate with bulletin board systems, information services, mainframe computers, and other personal computers. How do you get started in telecommunications? What kind of software do you need? Here's an overview.

Telecommunications has been big news lately. People are breaking into university systems and bank account files. They're even doing what some people said couldn't be done after *WarGames* came out: making some sort of contact with computers that monitor and control this country's defense system.

Translating Foreign Signals

In telecommunications, the information being sent from one computer to another travels over the telephone lines. Though this is the most efficient method available now, there is a problem: telephones and computers are based on different technologies. Phone systems are designed to filter out the very clicks and pops that computers use to communicate.

This is why you need a modem (MOdulator/DEModulator). This device modulates the computer's digital signals into analog signals, so the phone lines can carry them, and then demodulates them back into digital,



Anchor Automation's Volksmodem can interface with most personal computers via a separate cable. It is a direct-connect modem.

Now from Timex...a powerful new computer.

72K COLOR SOUND UNDER \$200



TIMEX SINCLAIR 2068

THEY'RE HERE.



River Raid™ and Kaboom!™ are here. And your Atari® home computer just became more fun than ever.

Because River Raid and Kaboom! have been re-designed to take full advantage of home computer capabilities.

Far beyond anything you've ever experienced before in video games.

Unique graphics, crisp detail and brilliant sound all come together with spectacular impact.

River Raid,™ the battle adventure up the "River of No Return."



The realism of Carol Shaw's River Raid is utterly amazing.

It challenges your reflexes, stamina and strategic savvy as you battle your way up the winding river.

Enemy choppers. Jets. Tanks. Hot-air balloons. Ships. All out to blow you to smithereens.

But you strike back. Keeping one eye on the ever-changing terrain.

Bridges. Mountains. Canyon walls. Islands.

One false move and it's curtains. And if you're up to it, now you can skip easier sections of the river and get right to the heart of the battle.

Everything that made River Raid such a smashing hit is here. And tons more.

Kaboom!™, the award-winning game of catch with buckets and bombs.

Larry Kaplan's Mad Bomber is back. The buckets are back.



But now, in Paul Willson's adaptation, you can drop the bombs, while someone else tries to catch them.

Imagine dropping bombs. Faster and faster.

To the ever-quickenning pace of the 1812 Overture.

You shift right. Left. Back again. All the way right.

He misses! You win!

Now it's your turn to catch. The pressure mounts.

The bombs start flying. You dash to catch them.

And so it goes on into the night.

And everytime you hit a new high score, it's displayed after the game, just like at the arcade.

Kaboom! and River Raid for your Atari home computer.

They're here. Just for the fun of it.



so the computer on the other end can receive them. The modem serves as a translator.

There are two types of modems commonly used with personal computers. *Acoustic modems* have a set of soft rubber cups into which you insert the phone's handset. One cup contains a speaker, which generates audio tones, the other a microphone, which receives tones from the other modem.

Once you have the correct hardware and software for telecommunications, there is a great deal of information that you can access.

Direct-connect modems plug directly into the telephone through a modular phone jack. Some, like the VICmodem, are cartridges that are plugged directly into a port on the computer. Others are stand-alone units about the size and shape of an eight-track cartridge tape which can be placed directly beneath the phone and plugged in. Some of these have a feature which allows you to switch from phone functions to modem functions. This spares you from having to keep connecting and disconnecting the modem when you want to use the phone to make a call.

Acoustic modems are generally less expensive but direct-connect modems generally offer a better connection, since the sound frequencies necessary for telecommunications are generated directly on the phone lines. Extraneous room noises can interfere when you're using an acoustic modem if the phone handset is not sealed very tightly in the cups.

Some computers come with a built-in modem. The Radio Shack TRS-80 Model 100 Portable Computer is an example. The modem functions and terminal software are contained inside the computer; all you need is a cable to start telecomputing.

Dumb Peripherals

If you turn your personal computer into a terminal when using a modem, how can it accomplish something as complicated as

transmitting data to another terminal around the block or around the world? Your computer must be able to send and interpret bits in the pattern you want, or you'll just be sending and receiving nonsense. This is why you need special software for telecommunications.

Some terminal software comes on cassette, some on disk, and some in cartridge form. There are several terminal programs in this issue.

Matching Up

Also, a modem must be properly aligned with another modem before information transmission is possible. Both modems must be matched in several ways.

Baud rate is the number of bits being sent every second. This can vary from 110, which is what the old teletypes use, up to 9600. The faster the rate, the lower your phone bills. But sending information as fast as 9600 bits per second really tests the capabilities of the telephone system. In order to establish communications, you need to know the baud rate at which the system you are calling is operating so that you can set your terminal software to the same rate.

Another factor is *duplexing*. Full-duplex means being able to send and receive data at the same time. Half-duplex allows for only one-way communication. If this is not matched correctly to the system with which you are communicating, you may see double characters on your screen or none at all.

Some terminal software allows you to *upload* and *download* programs. Say you have a friend in another part of the country who just programmed



The Racal-Vadic VA3413 is an acoustic modem. The telephone handset is pushed into the soft rubber cups on the side.



LAST NIGHT, COMPUSEVE TURNED THIS COMPUTER INTO A TRAVEL AGENT FOR JENNIE, A STOCK ANALYST FOR RALPH, AND NOW, IT'S SENDING HERBIE TO ANOTHER GALAXY.

**NO MATTER WHICH COMPUTER
YOU OWN, WE'LL HELP YOU GET
THE MOST OUT OF IT.**

If you've got places to go, CompuServe can save you time and money getting there. Just access the Official Airline Guide Electronic Edition—for current flight schedules and fares. Make reservations through our on-line travel service. Even charter a yacht through "Worldwide Exchange."

If your money's in the market, CompuServe offers a wealth of

prestigious financial data bases. Access Value Line, or Standard and Poor's. Get the latest information on 40,000 stocks, bonds or commodities. Then, consult experts like IDS or Heinold Commodities. All on line with CompuServe.

Or if, like Herbie, intergalactic gamesmanship is your thing, enjoy the best in fantasy, adventure, and space games. Like MegaWars, the ultimate computer conflict.

To get all this and more, you'll

need a computer, a modem and CompuServe. CompuServe connects with almost any personal computer, terminal, or communicating word processor. To receive an illustrated guide to CompuServe and learn how you can subscribe, contact or call:

CompuServe

Consumer Information Service, P.O. Box 20212
5000 Arlington Centre Blvd. Columbus, OH 43220
800-848-8199
In Ohio call 614-457-0002

Modem Manufacturers And Distributors

Listed below are the manufacturers and distributors of the modems included in our buyer's guide, as well as those of the major information and news services.

Anchor Automation
6913 Valjean Street
Van Nuys, CA 91406

Cermetek Microelectronics, Inc.
1308 Borregas Avenue
P.O. Box 3565
Sunnyvale, CA 94089

Commodore Business Machines
1200 Wilson Drive
West Chester, PA 19380

Emtrol Systems, Inc.
123 Locust Street
Lancaster, PA 17602

Hayes Microcomputer Products, Inc.
5923 Peachtree Industrial Boulevard
Norcross, GA 30092

Microbits Peripheral Products, Inc.
225 West 3rd Street
Albany, OR 97321

The Microperipheral Corporation
2565 152nd Avenue N.E.
Redmond, WA 98052

Novation, Inc.
20409 Prairie Street
Chatsworth, CA 91311

Prentice Corporation
266 Caspian Drive
P.O. Box 3544
Sunnyvale, CA 94088

Racal-Vadic
1525 McCarthy Boulevard
Milpitas, CA 95035

TNW Corporation
3444 Hancock Street
San Diego, CA 92110

Universal Data Systems
5000 Bradford Drive
Huntsville, AL 35805

board systems, information services, or other personal computers.

The World Of Telecomputing

Once you have the correct hardware and software for telecommunications, there is a great deal of information that you can access:

News and information services. CompuServe and The Source are two examples. Once you have purchased a subscription, you can call, type in your secret ID number or password, and have all kinds of information delivered to you immediately - news, sports, stock market reports. You can set up your own *electronic mailbox* so that messages can be left for you. CompuServe even has its own version of CB radio: You can get on-line with other people using the system and have a conversation.

Bulletin board systems. Offering some of the features of the major information services, there are hundreds of bulletin board systems set up in North America. Some of them are free, some require a membership fee. Most of them are designed to bring together people with common interests: owners of specific types of computers who want to share programs and help solve

News And Information Services

Here are addresses and phone numbers for some of the major news and information services. New York Zoetrope publishes *The Directory of On-Line Databases*; you can get one by sending \$29.95 plus \$1.50 for shipping and handling to New York Zoetrope, 80 East 11th Street, New York, NY 10003.

CompuServe
5000 Arlington Centre Boulevard
P.O. Box 20212
Columbus, OH 43220
Customer Service: (800) 848-8990
or (614) 457-8650

Dow Jones Information Services
P.O. Box 300
Princeton, NJ 08540
Customer Service: (800) 257-5114
or (609) 452-1511

The Source
1616 Anderson Road
McLean, VA 22102
Customer Service: (800) 336-3366
or (703) 734-7500

Telenet
(GTE Communications)
8229 Boone Boulevard
Vienna, VA 22180
Customer Service: (800) 572-0408 (in Virginia)
(800) 336-0437 (outside of Virginia)
(703) 442-2200 (outside of U.S.)

a great game and wants to share it with you, but doesn't have a printer. If you both have the same kind of computer, and an appropriate terminal program, that program can be uploaded (sent) to you. What you will be downloading is ASCII code (numbers which represent all possible screen characters). Each character is received one at a time. Not all terminal software has this capability; make sure that yours does if you want to be able to upload and download to and from bulletin

IMPROVE YOUR LIFE WHILE WATCHING TV?

Overcome annoying habits...build new and positive ones!

Eight **Expando-Vision™** subliminal programs are available to help you

1. Weight control/exercise
2. Stop smoking/general health
3. Stress control/positive thinking
4. Stop drinking/responsibility
5. Athletic confidence/golf
6. Study habits/memory power
7. Career/success motivation
8. Sexual confidence

Expando-Vision™ feeds positive subliminal messages to your subconscious while you watch regular TV programs. Flashed at 1/30 of a second, the messages occur too fast for your eye to see, but your subconscious uses that information to reinforce your will to succeed. Subliminal messaging has been shown effective in over 20 years of clinical and university research.

It is legal. The FCC limits commercial subliminal messages...but with **Expando-Vision**, you are personally at the controls in the privacy of your home. You can view the messages in slow motion to see exactly what they are.

It strengthens your will, but cannot compel you to do something against your will. **Expando-Vision** operates on well-established psychological principles of positive reinforcement.



Computer Hookup

To use the system you need an inexpensive home computer (VIC 20®, Commodore 64®, Atari 400® or Atari 800®). You need the **Expando-Vision** Interfacing Device. \$89.95 (a one time purchase that attaches easily to your computer)...and you need **Expando-Vision** programs \$39.95 each. (Add \$3.00 shipping and handling. Mich. residents add 4% sales tax.)

Credit Card Orders Call Toll Free 1-800-543-7500 Operator 828.

Tell us which program(s) you would like and charge your purchase to Visa, MasterCard, American Express or Diner's Club. Or request **free brochure**. Please use coupon, if paying by check or money order. Allow 4 to 6 weeks for delivery.

Full cost refund if not completely satisfied within 30 days of receipt.

Stimutech, Inc., P.O. Box 2575,
Dept. 301 A.E. Lansing, MI 48823

Ship To: Please Print

Address

City

State

Zip

Phone

Signature

Send me Subliminal Program Number(s)

☐ 01 ☐ 02 ☐ 03 ☐ 04 ☐ 05 ☐ 06 ☐ 07 ☐ 08

@ \$39.95 ea. Plus Interfacing Device at \$89.95 ea. Add \$3 shipping & handling. Michigan residents add 4% sales tax. TOTAL PRICE \$_____

Enclosed is check or money order
Computer Type: ☐ VIC 20 ☐ Commodore 64
☐ Atari 400/800 Specify ☐ Cart ☐ Disk
☐ Page 1 will use with cable transmitting on Ch. 02 ☐ 03 ☐ 04 ☐ Other: Send ☐ Dealer info
☐ FREE brochure: ☐ Enclosed is \$3 for System Manual only

Dealer inquiries, orders call 517-332-7717

NOTE TO BUYERS: Owners of VIC 20® and Commodore 64® Computers can view **Expando-Vision™** with TV signals from a TV antenna (Ch. 3 or 4 only), cable TV (transmissions on Ch. 3 or 4) or from any video cassette or video disk player. Atari 400 or 800 owners can use **Expando-Vision** with TV antenna (Ch. 2 or 3 only), Cable (transmissions on Ch. 2 or 3) or any video cassette or disk player. Systems compatible with other home computers are under development and will be introduced soon.



EXPANDO-VISION™
Straight To The Mind's Eye

hardware or software problems, people involved in ham radio, film buffs – even people who want to find a date.

Personal business. It may be possible soon to attend to most of your personal needs with your personal computer. Peripherals, an Exxon affiliate, has developed an interface that permits a bank to link up with almost any personal computer for individual bank transactions. Shopping by mail is possible through the Burbank-based "Fantasy Plaza." Expect to see more services like this

springing up.

Computer programs over the radio. It is possible to download computer programs from your radio. The Microperipheral Corporation has even developed a modem designed for reception of computer data from commercial radio stations. Though this is not a widespread use right now, radio stations and cable operations around the country may soon be following the lead of stations like KMPS in Seattle, which has been downloading computer programs by radio since March.

A Buyer's Guide To Modems

The following chart lists features of several modems compatible with personal computers. We have tried to include as many as possible; any omissions do not represent an editorial judgment on their quality. If you need more information about a specific modem, consult the list of manufacturers and distributors.

Here is a brief explanation of the categories on the chart:

- **Compatibility.** This is probably the most important consideration in choosing a modem. Since modems are serial devices, most are RS-232 compatible; some, however, are specific to certain machines. Even if your computer has an RS-232 port, make sure you have the necessary interface cable.

- **Communication Standard.** The Bell 103 is the most common communication standard found on modems available for personal computers. It allows information to be sent at the rate of 300 baud; some can go as fast as 600 baud. The Bell 202 and 212A facilitate data transmission at a faster rate.

- **Coupling Method.** A modem can link your home computer to the phone lines in one of two ways. A direct-connect modem plugs directly into the phone through a modular phone jack. Acoustic modems require a standard desk phone handset, so that the handset can be pushed directly into the modem's soft rubber cups.

- **Baud Rate.** Or, more technically correct, bits per second. A speed of 300 baud is pretty standard on most of the modems you will encounter.

- **Duplexing.** Half-duplex and full-duplex indicate whether information can be sent and received at the same time. When telecomputing, failure to match your modem's

duplexing abilities with those of the modem at the other end may result in character duplication or "echo."

- **Auto-Answer.** This feature is necessary if you want to be able to automatically answer calls from other telecomputing stations (for example, if you want to set up a bulletin board system for others to call).

- **Auto-Originate.** Lets your modem dial phone numbers to call other telecommunications facilities.

- **Self-Test.** Some modems have the capability to test themselves to see if everything is hooked up correctly and working.

- **Carrier Detection Indicator.** How can you tell if you have connected with the party at the other end? Most modems have a way of indicating this to you, either by a light or LED on the modem itself, or by a signal that appears on the screen.

- **Power Supply.** Your modem must operate from some kind of power source. Usually this is through a wall socket or internal battery; sometimes the modem draws its power directly from the host computer.

- **Cables/Connectors Included?** Connecting your modem to your computer may require the purchase of additional cables or connectors like an RS-232 cable (if you do not already own one), or some other kind of system-specific connector. Some, like the VICmodem, plug directly into the computer.

- **Terminal Software Included?** Some modem packages include terminal software. If the one you buy does not, you will need to either purchase a program or type one in from a magazine or book.

- **Price.** The modems listed on this chart include suggested retail prices at the time of this writing.

Buy Micromodem II[™] with Smartcom I[™] software *right now*, and get this \$140 value FREE!

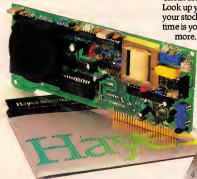
Subscription to THE SOURCE,
including User's Manual.
Value \$100*

One hour connect time.
Value \$20.75**

A comprehensive hard-bound
handbook on communications.
Value \$19.95



Your Apple's telephone.
Hayes



their toll-free number. And you're already well on your way to getting on-line!
It frees up your time. This offer also entitles you to \$20.75 worth of connect time—at no charge. Use it as you please! Check the latest news and sports. Look up your flight schedule. View your stock portfolio. You name it. The time is yours! Sixty minutes worth, or more, depending on the day and hour.
Giving you lots of connections. THE SOURCE has assembled the most comprehensive programs available on any system. For fun and practical applications. From games to commodity news. Electronic mail to teleconferencing.



Discount shopping to abstracts of articles from business magazines. And everything you need to know is right there in your comprehensive, illustrated User's Manual. It's included with your free membership to THE SOURCE during this special, limited time offer from Hayes.

Plus the last word on communications. Now here's a book that delivers what it promises! In Alfred Glossbrenner's best seller, **THE COMPLETE HANDBOOK OF PERSONAL COMPUTER COMMUNICATIONS**, you'll find a thorough, informative

study of microcomputer communications. Worth every cent of the \$19.95 this hard-bound book sells for. And yours absolutely free! *If you act now!* See your dealer soon. Buy Micromodem II with Smartcom I, and get the best telecomputing system for your Apple. Plus a \$140 value FREE. Hayes Microcomputer Products, Inc. 5923 Peachtree Industrial Blvd., Norcross, Georgia 30092. 404/449-8791.

Between Nov. 1-Jan. 15, you and your Apple can make the big break. From isolated desktop computing. To the exciting world of telecomputing. With Hayes Micromodem II and Smartcom I communications software. A complete telecomputing package for Apple II, III, IIe or Apple Plus computers. Let Micromodem II connect you, via telephone lines, to computers, terminals and information services all across America. Including THE SOURCE[™] AMERICA'S INFORMATION UTILITY[™]. This offer takes you right to THE SOURCE! And you won't have to pay to join! The same day you purchase your Micromodem II with Smartcom I, call THE SOURCE on

Here's all you have to do:

1. When you purchase your Micromodem II with Smartcom I, save your sales receipt and Hayes registration card (packed inside the box).
2. Pick up the phone and call THE SOURCE, on their toll-free number **1-800-336-3366**. Tell THE SOURCE representative that you are participating in the special Hayes promotion, give the serial number of your Micromodem II (on the modem), and your credit card number (VISA, MasterCard, or American Express). You will get your password to THE SOURCE, right on the spot.
3. Within a week you will receive an agreement from THE SOURCE, along with your New Member Kit. Sign the agreement, and return it within 30 days to THE SOURCE, along with your sales receipt for Micromodem II/Smartcom I and Hayes registration card. Remember, send no money. Your membership is free!
4. That's all it takes! Look for your User's Manual and free communications book within two weeks of receipt of the agreement, sales receipt and registration card.

(THE SOURCE requires a major credit card for billing of hourly connect time to individual members. Corporate members may apply for direct billing.)

*Suggested retail price. **60 minutes or more connect time, depending on the day and hour.

©1983 Hayes Microcomputer Products, Inc. Micromodem II, IIe and Smartcom I are trademarks of Hayes Microcomputer Products, Inc. THE SOURCE and AMERICA'S INFORMATION UTILITY are service marks of Source Telecomputing Corporation, a subsidiary of The Reader's Digest Association, Inc. Apple Computer is a registered trademark of Apple Computer, Inc.

MODEM	Volkensodem	Mark VI	Mark VII	Mark X	Mark XI	AutoVIC 1050	VICmodem	Info-Ware ZIZA	TRIS-80 Lynx
Manufacturer/Distributor	Anchor Automation	Anchor Automation	Anchor Automation	Anchor Automation	Anchor Automation	Commodore Business Machines	Commodore Business Machines	Cematek Micro-Electronics, Inc.	Enrol Systems, Inc.
Compatibility	most personal computers	IBM PC	RS-232	Hayes-compatible	Hayes-compatible	Commodore 64	VIC-20 and Commodore 64	RS-232	TRIS-80 L III
Communication Standard	Bell 103	Bell 103	Bell 103	Bell 103	Bell 212A	Bell 103	Bell 103	Bell 212A	Bell 103
Coupling Method	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect
Baud Rate	300	300	300	300	300-1200	0-300	0-300	300-1200	300
Duplexing	full/half	full/half	full/half	full/half	full/half	full/half	full	full	full/half
Auto-Answer	no	yes	yes	yes	yes	yes	no	yes	yes
Auto-Originate	yes	yes	yes	yes	yes	yes	no	yes	yes
Self-Test	yes	no	no	no	no	no	no	yes	no
Carrier Detection Indicator	veriz	tone	light	light	veriz	LED	LED	light	LED
Power Supply	9-volt battery	host computer	AC	12-volt adapter	12-volt adapter	host computer	host computer	AC	AC
Necessary Cables/Connectors Included?	no	plugs into computer	yes	yes	yes	plugs into computer	plugs into computer	yes	yes
Terminal Software Included?	no	yes	no	no	no	no	yes	no	yes
Warranty	lifetime	2 years	2 years	2 years	2 years	90 days	90 days	1 year	1 year
Price	\$79.95 (\$12.95 for cable)	\$239	\$199.95	\$179.95	\$299	\$179.95	\$199.95	\$595.00	\$299.95
MODEM	Apple Lynx	Hayes Micro-modem 100	Microcommodor 8	Stack Smartmodem 300	Smartmodem 1200	Smartmodem 1200B	MPP-1000C	Micro-connection 01	Micro-connection R1
Manufacturer/Distributor	Enrol Systems, Inc.	Hayes Microcomputer Products, Inc.	Hayes Microcomputer Products, Inc.	Hayes Microcomputer Products, Inc.	Hayes Microcomputer Products, Inc.	Hayes Microcomputer Products, Inc.	Microbit	The Micro-peripheral Corp.	The Micro-peripheral Corp.
Compatibility	Apple II, II+	5-100 bus	Apple	RS-232	RS-232	IBM-PC	(also no 550 needed)	Osborne	RS-232
Communication Standard	Bell 103	Bell 103	Bell 103	Bell 103	Bell 103 & 212A	Bell 212A	Bell 103	Bell 103	Bell 103
Coupling Method	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect
Baud Rate	300	45-330	110 or 300	0-300	0-300 & 1200	0-300 & 1200	300	300	300
Duplexing	full/half	full	full	full/half	full/half	full/half	full/half	full/half	full/half
Auto-Answer	yes	yes	yes	yes	yes	yes	yes	no	no
Auto-Originate	yes	yes	yes	yes	yes	yes	yes	no	no
Self-Test	no	no	no	yes	yes	yes	no	no	no
Carrier Detection Indicator	LED	none	LED on board	LED	LED	on screen	tone	LED	LED
Power Supply	AC	host computer	host computer	AC	AC	AC	AC	AC	AC
Necessary Cables/Connectors Included?	yes	yes	yes	no	no	no	yes	yes	yes
Terminal Software Included?	yes	no	yes	no	no	yes	yes	no	no
Warranty	1 year	2 years	2 years	2 years	2 years	2 years	1 year	90 days	90 days
Price	\$299.95	\$299	\$400	\$299	\$699	\$599	\$149.95	\$199	\$159

THE LAST ONE

The first program you should buy.

The more you use your computer, the more you want it to work for you.

But where do you begin? There are literally thousands of programs. It's time consuming, confusing and frustrating! The answer is to begin with THE LAST ONE™.

THE LAST ONE... The program that writes programs!

Now, for the first time, your computer is truly 'personal'. Now, simply and easily, you can create software the way you want it.

From Accounting to the Zodiac, THE LAST ONE puts you keystrokes away from whatever you need from your computer.

THE LAST ONE... See it at your dealer and buy it first!

Available for Commodore 64™, Commodore 8032™, IBM PC™, Victor 9000™, Apple II™ and IIe™, Radio Shack Model II™ and most CP/M™ systems.

Distributed By
 **Computer
Marketing**
Services, Inc.

300 W. Marlton Pike, Cherry Hill, NJ 08002 (609) 795-9480

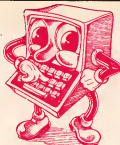
Product of BLUE SKY SOFTWARE

*THE LAST ONE is a registered trademark of D. J. "AI" Systems, Ltd.

The Commodore 64 & CBM 8032, IBM PC, Victor 9000, Apple II & IIe, Radio Shack Model II and CP/M are registered trademarks of Commodore Business Machines Inc., International Business Machines Corp., Victor Technologies, Inc., Apple Computers, Inc., The Tandy Corporation, and Digital Research Corp., respectively

MODEM	Micro-connection T3	P-Connection Modem Card	Micro-connection A1-A	Micro-connection A2-A	Micro-connection TC1	Micro-connection A3	Micro-connection R1-A	Micro-connection T1-A	Micro-connection A2
Manufacturer/Distributor	The Micro-Peripheral Corp.	The Micro-Peripheral Corp.	The Micro-Peripheral Corp.	The Micro-Peripheral Corp.	The Micro-Peripheral Corp.	The Micro-Peripheral Corp.	The Micro-Peripheral Corp.	The Micro-Peripheral Corp.	The Micro-Peripheral Corp.
Compatibility	TRS-80 Model I	IBM-PC	Atari (with 850)	Atari (no 850)	TRS-80 Color	Atari (with 850)	RS-232	TRS-80 II, II, 16	Atari
Communication Standard	Bell 103	Bell 103/113	Bell 103	Bell 103	Bell 103	Bell 103	Bell 103	Bell 103	Bell 103
Coupling Method	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect
Baud Rate	300	300	300	300	300	300	300	300	300
Duplexing	full/half	full/half	full/half	full/half	full/half	full/half	full/half	full/half	full/half
Auto-Answer	no	yes	yes	no	no	no	yes	yes	no
Auto-Originate	no	yes	yes	yes	no	no	yes	yes	no
Self-Test	no	no	no	no	no	no	no	no	no
Carrier Detection Indicator	LED	on screen	LED	LED	LED	LED	LED	LED	LED
Power Supply	AC	host computer	AC	AC	AC	AC	AC	AC	AC
Necessary Cables/Connections Included?	yes	yes	yes	yes	yes	yes	yes	yes	yes
Terminal Software Included?	yes	yes	yes	yes	no	yes	no	yes	yes
Warranty	90 days	90 days	90 days	90 days	90 days	90 days	90 days	90 days	90 days
Price	\$209	\$170	\$239	\$279	\$199.50	\$199	\$199	\$259	\$249

MODEM	Micro-connection Auto-Print	Cat	D-Cat	Auto-Cat	212 Auto-Cat	Apple-Cat II	212 Apple-Cat II	J-Cat	103 Smart-Cat
Manufacturer/Distributor	The Micro-Peripheral Corp.	Novation, Inc.	Novation, Inc.	Novation, Inc.	Novation, Inc.	Novation, Inc.	Novation, Inc.	Novation, Inc.	Novation, Inc.
Compatibility	RS-232	RS-232	RS-232	RS-232	RS-232	Apple II, II+, IIx	Apple II, II+, IIx	RS-232	RS-232
Communication Standard	Bell 103	Bell 103	Bell 103	Bell 103	Bell 103 & 212A	Bell 103 & 202	Bell 103 & 212A	Bell 103	Bell 103
Coupling Method	direct-connect	acoustic	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect
Baud Rate	300	0-300	0-300	0-300	0-300 & 1200	0-300 & 1200	0-300 & 1200	0-300	0-300 & 119
Duplexing	full/half	full/half	full/half	full/half	full/half	full/half	full/half	full	full
Auto-Answer	yes	no	no	yes	yes	yes	yes	yes	yes
Auto-Originate	yes	no	no	yes	yes	yes	yes	yes	yes
Self-Test	no	yes	yes	yes	yes	yes	yes	yes	yes
Carrier Detection Indicator	LED	LED	LED	LED	LED	light	light	LED	LED
Power Supply	host computer	AC	AC	AC	AC	host computer	host computer	AC	AC
Necessary Cables/Connections Included?	yes	yes	yes	yes	yes	yes	yes	yes	yes
Terminal Software Included?	yes	no	no	no	no	yes	yes	no	no
Warranty	90 days	1 year	1 year	1 year	1 year	1 year	1 year	1 year	1 year
Price	\$149.55	\$189	\$199	\$248	\$695	\$399	\$725	\$149	\$249



INTEC RAM BOARDS

Lifetime Warranty
ATARI

32K	400 / 800	59.95
48K	400	84.95
64K	400	109.95
16K	Vic 20	69.95

PRINTERS

EPSON FX 80	529.95
EPSON FX 100	729.95
PROWRITER 8510 AP	369.95
GEMINI 10 X	294.95

INTERFACES

Microbits MPP 1100 Atan	79.95
Grappier + Apple	124.95
Cardco VIC 20 '64'	59.95

MODEMS

MPP 1000 Atan Direct-Connect W/Term.	
Software (plus 800 needed)	159.95
Hayes Smart Modem 300 Baud	209.95
Rams 1000 Drive	349.95

Ordering Information:

We accept M/C, VISA, Money Orders, and Cashier Checks. Sorry No C.O.D.s.

SHIPPING: Add 3% UPS (\$3.00 Minimum)
APO/FFO 5% (\$5.00 Minimum) International
Orders 10% (\$10.00 Minimum). Credit Cards add
3% California Residents add 6% Sales Tax

MICRO MERCHANT

898 Via Lata Suite H
P.O. Box 1516 C
Colton, CA 92324

ORDERS ONLY
800-652-8391
Customer Service
714-824-5555



"Your Portfolio, Sir."

The DOW JONES INVESTMENT EVALUATOR™ is computer software that serves your personal investment needs at home—accurately and efficiently.

A Personalized System

With the INVESTMENT EVALUATOR, your home computer and a telephone modem, you have a personalized system for managing your portfolio. A system that automatically updates and tracks only those stocks you want to follow—allowing you to evaluate your position at a glance.

Easy Access to News/Retrieval

This software automatically dials and connects you with Dow Jones News/Retrieval®, the world's leading supplier of computerized information on demand. It allows you and your family access to current quotes, financial and business news, general news, movie reviews, sports, weather and even the Academic American Encyclopedia.

The Right Amount of Software for the Job

The INVESTMENT EVALUATOR gives you the capabilities you need without making you pay for a lot of complex functions you may never use. Menu screens lead you to what you want with one-touch commands. The program is completely reliable, comes with an easy-to-follow manual and is fully supported by the Dow Jones Customer Service hotline.

From Dow Jones, Publishers of The Wall Street Journal

Dow Jones has been serving the business and financial communities for 100 years. Now Dow Jones Software™ serves you at home.

For a free brochure call:
1-800-345-8500 ext. 252

(Alaska, Hawaii and foreign call 1-215-389-7000 ext. 252)



DOW JONES SOFTWARE

Dow Jones Investment Evaluator™

...Bank on it.

Available for Apple II, Apple IIe,
IBM PC and XT Professional.
Compatibility with Atari and
Commodore to follow.

Copyright © Dow Jones & Co., Inc. 1982. All Rights reserved.

MODEM	103-212 Smart-Cat	Star Acoustic	P-113D	P-212	VA163 Modemphone	VA515	VA317	VA355	VA1252 G/K
Manufacturer/ Distributor	Novation, Inc.	Prentice Corp.	Prentice Corp.	Prentice Corp.	Racal-Vadic	Racal-Vadic	Racal-Vadic	Racal-Vadic	Racal-Vadic
Compatibility	RS-232	RS-232	RS-232	RS-232	RS-232	RS-232	RS-232	RS-232	RS-232
Communication Standard	Bell 103 & 212A	Bell 103	Bell 103	Bell 103 & 212A	Bell 103/113	Bell 103/113	Bell 113B/119C	Bell 103/113	Bell 202
Coupling Method	direct- connect	acoustic	direct- connect	direct- connect	direct- connect	direct- connect	direct- connect	direct- connect	direct- connect
Baud Rate	0-300 & 1200	0-300	0-300	0-300 & 1200	0-300	0-300	0-300	0-300	0-1200
Duplexing	full	full/half	full/half	full/half	full	full	full	full	full/half
Auto-Answer	yes	no	yes	yes	yes	yes	yes	yes	no
Auto-Originate	yes	no	no	no	yes	no	no	no	no
Self-Test	yes	yes	yes	yes	no	yes	yes	yes	no
Carrier Detection Indicator	LED	LED	LED	light	lamp	LED	LED	LED	LED
Power Supply	AC	AC	AC	AC	AC	AC	AC	AC	AC
Necessary Cables/ Connectors Included?	yes	yes	yes	yes	yes	yes	yes	yes	yes
Terminal Software Included?	no	yes	yes	yes	no	no	no	no	no
Warranty	1 year	1 year	1 year	1 year	1 year	1 year	1 year	1 year	1 year
Price	\$295	\$199	\$260 (rack mounted) \$365 (stand-alone)	\$495 (rack mounted) \$695 (stand-alone)	\$250-\$380	\$375	\$250	\$375	\$525
MODEM	VA1250/55	VA3413	VA212PA	VA212LC	TNW-103	Operator 103	UDS-212LP	UDS-103JLP	UDS-103 O/A LP
Manufacturer/ Distributor	Racal-Vadic	Racal-Vadic	Racal-Vadic	Racal-Vadic	TNW Corporation	TNW Corporation	Universal Data Systems	Universal Data Systems	Universal Data Systems
Compatibility	RS-232	RS-232	RS-232	RS-232	FET/CIM IEEE-488	RS-232	RS-232	RS-232	RS-232
Communication Standard	Bell 202	Bell 103	Bell 103/212A	Bell 103/212A	Bell 103	Bell 103	Bell 212A	Bell 103	Bell 103
Coupling Method	direct- connect	acoustic	direct- connect	direct- connect	direct- connect	direct- connect	direct- connect	direct- connect	direct- connect
Baud Rate	0-1200	0-300, 1200	0-300, 1200	0-300, 1200	300	0-300	1200	0-300	0-300
Duplexing	half	full	full	full	full/half	full/half	full	full	full
Auto-Answer	yes	no	yes	yes	yes	yes	no	yes	no
Auto-Originate	no	no	yes	no	yes	yes	no	no	no
Self-Test	yes	yes	yes	yes	yes	yes	no	no	no
Carrier Detection Indicator	LED	LED	LED	LED	on screen	beep	none	none	none
Power Supply	AC	internal	AC	AC	AC	AC	telephone line	telephone line	telephone line
Necessary Cables/ Connectors Included?	yes	yes	yes	yes	yes	yes	yes	yes	yes
Terminal Software Included?	no	no	no	no	yes	no	no	no	no
Warranty	1 year	1 year	1 year	1 year	1 year	2 years	1 year	1 year	1 year
Price	\$425-\$525	\$695	\$795	\$550	\$449	\$189	\$445	\$195	\$145

BEFORE**AFTER****SAVE \$20.00**

WORD PROCESSING THE DECISION IS EASY!!!

Datsoft eliminates the frustrations of choosing a word processor. When it comes to ease of use, versatility, and price, Datsoft beats the competition hands down, and now both Text Wizard™ and Spell Wizard™ have been combined into a specially marked package to save you \$20.00.

Text Wizard, one of few programs to receive four (4) excellents on the Infoworld Report Card Review, let's you create letters, documents, reports and much, much more. It's as simple as a few keystrokes to edit, erase, move lines or paragraphs.

With Spell Wizard and its 33,000 + Word Dictionary, you can eliminate embarrassing typos or spelling errors.

InfoWorld
Software Report Card
Text Wizard

It's Wonderful!	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Excellent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not Good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Text Wizard
Atari 400/800 (32K min.)



Spell Wizard
Atari 400/800/1200 (32K min.)

Spell Wizard automatically indicates errors, and allows you to immediately view your dictionary for easy correction. You can also create or add unique words to your own custom dictionary.

You might expect to pay \$79.00 to \$99.00 for only one of these programs, however, Text Wizard normally \$49.95 and Spell Wizard normally \$49.95 suggested retail, can both be purchased for a limited time in specially marked packages for only \$79.95 total price, a savings of \$20.00.

Check with your local dealer or send check or money order with \$3.00 postage and handling (California residents add 6 1/2% sales tax) to:

9421 Winnetka Avenue, Chatsworth, CA 91311 (213) 701-5161

DATASOFT, INC. **Datsoft®**

Adding Peripherals

Building A Home Computer System

Otis Cowper, Technical Editor

Taken together, peripherals can end up costing more than your computer, so making the right purchases is a must. What brand should you buy? What "extras" are needed? Will you need software just to operate your peripheral? This article helps define the more critical issues involved.

Computer enthusiasts often brag about their "systems," adding an aura of sophistication to their home setups. These systems usually consist of a basic microcomputer surrounded by an assortment of peripherals. Essentially, a peripheral is anything you plug into your computer.

Without even realizing it, you started adding peripherals and building your system as soon as you bought your computer. Your first peripheral was most likely a TV or video monitor, and the next was probably a cassette tape unit to load and store programs or a joystick to use with your favorite game. From there, the list of possible peripheral devices goes on and on: printers, disk drives, modems, memory expansion cartridges, light pens, speech synthesizers, plotters, etc.

It's up to you to decide which peripherals you need: a disk drive for serious word processing, a color monitor for really sharp video displays, a modem for telecommunications. The economics of the situation should dictate the amount of time you spend comparing the available models of the item you want.

If you have been shopping for any of these items, one thing you've realized, is that it's not at all unusual for a peripheral device to cost quite a bit more than the computer to which it is attached. It might take you a while to get adjusted to the idea of hooking a \$600 printer up to your \$100 computer. But the overriding issue is compatibility: Will the peripheral you want work with your computer system? It's easy to see that you should choose your peripherals carefully.

Which Brand Is Best?

The obvious way to guarantee that the peripheral devices you buy will work in your system is to buy them from the same company that made your computer. Another source is the alternate "third party" suppliers and many of them offer truly innovative designs.

Most home computer peripherals are someone else's product wearing a new name. The computer company buys the hardware in huge quantities from the original manufacturer and then puts on its own brand label. In many cases, a similar product is also available directly from the original maker.

The key to whether a product is a better buy from the original manufacturer or the reseller can lie in whether the reseller just slapped on a logo or whether the product was modified to optimize its performance in conjunction with a particular computer. This isn't usually something that is obvious. One way to check is to see if the peripheral supports any of the computer's special features. For example, Commodore computers have a set of built-in graphics characters which are directly accessible from the keyboard. Commodore sells a printer made by another company, but modified to print the special characters. Similar printers are available under other brand names, but the others either will not print the graphics characters or will print them only if you pay extra for an additional ROM chip and install the chip in your printer.

Read The Fine Print

Price should not be your sole concern when deciding what peripheral to buy. An important factor to consider is ease of interfacing. Again using printers as an example, a \$300 printer that requires a \$75 interface module to be used with your system is *not* a better buy than a \$350 model that would plug in directly. Moreover, all interfaces are not



"Popular Computing says The Home Accountant does just about everything you'd ask of a personal finance package."*

"You mean you can use The Home Accountant for business, too?"

"The Home Accountant is the #1 best-selling home finance package in the world."

"The Home Accountant even flags transactions for tax time. And that's a big time-saver because I can transfer information to The Tax Advantage™ program and easily figure out what I owe."

"My company has 5 checking accounts, 6 business credit cards and 3 money market funds to keep track of. The Home Accountant makes it easy."

"Absolutely. Wouldn't want to run my consulting firm without it."

"Softalk Magazine says it's the most thorough and powerful program of its kind."†

"I agree."

"It automatically prints my checks. And gives them a very professional look."

"The Home Accountant is great for realistic budgeting."

"I'm so glad you brought it home. I never thought that creating a budget and managing money could be so easy."

"You can create trend analysis graphs for each budget category, so you can make visual comparisons of where you stand financially."

"And you can do it in full-scale color graphics."

"It has up to 200 budget categories so I have all the flexibility I need."

"The Home Accountant will even print a personal financial statement and net worth statement. Keeps me right on top of my finances."

* Popular Computing, November, 1982
† Apple Softalk, April, 1982

Everyone's talking about The Home Accountant.™

Is it because it's the #1 bestselling home finance package in the world? Or because it's extremely thorough and powerful and easy to use? Or because it's great for home and business use? Or because it has up to 200 budget categories and handles up to 5 checking accounts?

Yes. But there are a lot more reasons why people buy The Home Accountant. And why you will, too.

Because The Home Accountant can literally save you hours of time. And take the headache out of handling your finances. Whether it's setting up a budget, cataloging your expenses, balancing your checkbooks or handling your credit cards and money market funds. For personal or business use.

The Home Accountant will even print net worth and financial statements. Not to mention being a lifesaver at tax time. Especially when you're able to transfer information onto Continental's The Tax Advantage™ program and figure out what you owe. Quickly.

In short, The Home Accountant is the most effective software program there is for managing your money. And managing it easily.

Stop by your Continental Software dealer today and pick up The Home Accountant. You'll see what everyone's talking about.

The Home Accountant is available for Apple II/IIe, IBM PC/XT, Atari 400/800/L200XL, Osborne® TRS-80 Models III/4, Commodore 64, Texas

Instruments Professional, Zenith Z-100/110, Compaq and KayPro computers. Actual budget capacities will vary with each computer.

For your free 48 page booklet, "Tips For Buying Software," please write Continental Software, 11223 South Hindry Avenue, Los Angeles, CA 90045, 213/417-8031, 213/417-3003.



**Continental
Software**
A Division of Array, Inc.



How to get in touch

**KoalaPad™ Touch Tablet
puts the controls
at your
fingertips.**

Paint the screen with colorful graphics or play lightning-fast games with just a touch of your finger. The KoalaPad™ Touch Tablet makes using your computer more fun than ever before. Just moving your finger across the special touch-sensitive surface controls graphics, game commands, and much more. It's a great way to get the most out of your computer while you just sit back and



with your computer.

relax. The KoalaPad fits comfortably in the palm of your hand for easy use. And once you have it in

Dancing Bear™ brings a funny, furry cabaret star right into your home where your own programmed performances will amuse every time



your hands, it's hard to put down. That's because the KoalaPad does much more than joysticks, paddle controllers or the "mouse." Each KoalaPad set is packaged with a KoalaWare™



Spider Enter™ the game that attracts musical education with a voracious appetite taking a bite out of the task of learning the musical scale

graphics program* for creating beautiful, high-resolution graphics right on the screen.

And that's just the beginning

There's a full line of KoalaWare programs to choose from

with a perfect

Logo Design Master™ uses computerized graphic design to help children and adults learn the basics of programming and prepare for more advanced applications

combination of entertainment and education.

Add a touch of excitement today to your Apple®, Atari®, Commodore® or IBM® computer.

See the KoalaPad

Touch Tablet at the computer store nearest you. To locate the dealer in your area, call toll free 800-227-6703. (In California, 800-632-7979).

Koala
Technologies Corporation

We make computing more personal.™



KoalaPad, KoalaWare, Logo Design Master, Spider Enter, and Dancing Bear are trademarks of Koala Technologies Corporation. Spellscouter is a trademark of DesignWare, Inc.

Koala Technologies Corporation,
3800 Patrick Henry Drive,
Santa Clara, CA 95050

*Software included with Touch Tablet varies with computer type.

created equal.

We recently saw an interface which could be used to connect the VIC-20 to a popular brand of dot matrix printer. We assumed at first that using the interface was simply a matter of plugging one cable from the interface into the computer and another cable into the printer. It was only when we read the fine print in the instruction manual that we discovered we had to go inside the printer and solder in a wire to provide power for the interface. Such a modification would certainly void any warranty on the printer, and should not be undertaken thoughtlessly. This is the kind of detail that you need to investigate thoroughly before you buy any peripheral that doesn't plug directly into your system.

You should also check to see if any special cables are required to connect the peripheral to your computer or to the necessary interface. Many buyers have been dismayed to arrive home with a new peripheral only to discover that a special cable is required to hook it up to their system. They can get even more dismayed when they discover that the manufacturer wants \$35 for the necessary cable. Owners with some soldering experience may be able to save some money by building the cable themselves if they can find the necessary connectors, but, again, it's really not a job for beginners so you should make sure that all necessary cables are included with the peripheral.

The Software Issue

Yet another item to consider is support software. Some peripherals require no special software; others are useless without it. For example, the same light pen can be used interchangeably on an Atari, VIC, or 64. However, without software to read the light pen and convert the value for the light pen position to an equivalent screen location for your particular machine, the pen doesn't do you much good.

If you're not a sufficiently advanced programmer to write your own support software, you should be sure that programs for your computer model are included with the hardware. This is especially true for complex peripherals like speech synthesizers and plotters. If you don't get software for your computer with the device, you can face possibly spending quite a bit of time developing your own.

Lack Of Standardization

There are few standards for home computer peripherals. Much of the lack of standardization is the result of the various companies following different design philosophies. For example, the mechanical workings of all 5-1/4 inch floppy disk drives are essentially identical, but drive units for particular computers are not at all interchangeable.

Using the same basic hardware, a Commodore drive stores data on the diskette in 683 256-byte sectors; a TRS-80 Color Computer drive creates 630 256-byte sectors; an Apple II drive, 560 256-byte sectors; and a Texas Instruments drive, 360 256-byte sectors. An Atari drive uses 720 sectors, but each sector is only 128 bytes long. The Commodore writes the directory on track 18 of the disk, the Apple and TRS-80 on track 17, and the TI on track 0. This not only makes the disk drives incompatible, but also means that disks written by one brand cannot be read by another. Each manufacturer has strong arguments why the particular method it chose is the best, and no one seems willing to compromise in the name of compatibility.

Interfaces

A few attempts at standardization have been made. For example, a company called Centronics was one of the first major suppliers of computer printers. Centronics used a parallel interface scheme in which data was sent to the printer one byte at a time. Companies which entered the market later used Centronics' connection so that their printers could be easily attached to computers set up for Centronics printers. So this connection scheme, with its 36-pin plug, became the de facto standard, and Centronics parallel interfaces are now available for most home computers.

A more formal standard has been established for serial data communications. The standard, called RS-232, calls for a set of wires including a transmitted data line, a received data line, and a collection of "handshaking" signal lines to regulate data transfer. Moreover, a particular type of plug called a DB25 is almost always used on RS-232 data lines, and each pin on this plug has been assigned a particular RS-232 signal. So if you have an RS-232 port on your computer, you can interface without problems to an RS-232 peripheral, right?

Unfortunately, it's not always that simple. The RS-232 standard defines a set of signal lines, but fails to specify what shall be considered a valid signal on those lines. Some RS-232 systems use +12 volts and -12 volts as the two signal levels, some use +5 volts and -5 volts, and a few others use +5 and 0 volts. For example, the VIC-20 and Commodore 64 have the ROM software built in to support RS-232 communications through the user port on the computer, but you still must plug an interface module into the user port to increase the output voltage levels before you can use most non-Commodore RS-232 devices. You should be aware of this before purchasing any RS-232 "standard" equipment.

At some point in the future, one company may come to so dominate a sufficiently large share of the home computer market that it determines the standard for everyone. Some are predicting

ATARI COMPUTER OWNERS:

Pick the positively perfect, practical, **printer-port** peripheral package, from **PERCOM DATA!**



That's right... the positively perfect PERCOM DATA 5 1/4" floppy disk drive with a BUILT-IN PRINTER-PORT for your Atari® 400/800 is now available!

Until now, Atari computer owners who wanted to hook a printer to their computer had only one choice... spend about \$220 for an interface device. THOSE DAYS ARE OVER. PERCOM DATA has built a parallel printer-port right into its new AT88 PD model. Now you can add a quality disk drive system AND have a place to plug in a printer WITHOUT BUYING an interface.

The AT88 S1 PD™ disk drive operates in both single density (88K bytes formatted) and double density (176K bytes formatted). What more could you want? NO INTERFACE... a high quality PERCOM DATA disk drive... AND a built-in PRINTER-PORT... all with a price of \$599.

Pick up a positively perfect PERCOM DATA disk drive, with printer-port... pronto!

For the name of an authorized PERCOM DATA Dealer near you, call our **TOLL-FREE HOTLINE 1-800-527-1222 NOW**, or write for more information.

Perfectly Priced

\$599.

PERCOM DATA
CORPORATION

Expanding Your Peripheral Vision

DRIVES • NETWORKS • SOFTWARE

11220 Pagemill Road, Dallas, Texas 75243 (214) 340-5800

1-800-527-1222

Atari is a registered trademark of Atari, Inc. • AT88 S1 PD is a trademark of Percom Data Corporation. • COPYRIGHT PERCOM DATA CORPORATION 1983
Prices subject to change without notice.

Choosing The Right TV

Michael A. Covington

"What kind of TV should I get to use with my computer?" This is a frequently asked question nowadays, and a good answer can be hard to get. Low-priced microcomputers are designed with the idea that you'll use the TV that you already have, to keep costs down. But perhaps you don't want to interrupt the whole family's TV viewing every time you want to work on a program, or perhaps there was no TV set in your home before you got a computer. In these cases, you must shop for a TV – and some TV sets are much more suitable for computer use than others.

Size And Color

The first question to be settled is, what size? That depends on whether you want to look at the screen from across the room, with the computer on the coffee table in front of you, or whether you want to put the TV on your desk right behind the keyboard. The coffee-table arrangement is usual for joystick game playing, and the ideal TV size is the same as for watching TV programs at the same distance. But a TV set that is to go on your desk should probably be in the 10- to 12-inch range; a 19-inch will be far too big to read comfortably, and even a 5-inch will give a crisp, small, very readable display, with letters about the same size as those produced by a pica typewriter.

Color or black-and-white? That depends mainly on how much money you want to spend and whether you want a color picture. For computerizing your finances or learning BASIC, you probably don't need a color display; for playing *Pac-Man*, you probably do. Very small (under-10-inch) color TV sets often show a lack of fine detail because the color phosphor dots can't be made small enough in proportion to the size of the screen; no such problem occurs with black and white.

A computer that generates a color display can of course be used with a black-and-white TV; you get a black-and-white version of the display, with different colors rendered as different shades of gray. A few computers, such as the Timex/Sinclair 1000, do not generate color.

The main thing you want out of the TV set's performance is sharpness. In the dealer's showroom, watch TV programs and commercials that place lots of lettering on the screen. Manipulate the fine tuning until the lettering is as sharp as possible, then look at the final results. An overall smeared appearance is a bad sign; the better you can get the lettering to look, the better the TV set will perform with a computer.

Convenient Controls

You also need convenient access to certain controls – volume, brightness, contrast, and, for color sets, tint and color saturation. All of these controls need readjusting when you switch between computer usage and ordinary TV viewing; they should be conveniently accessible on the front panel, not hidden away in back.

Preferably, the TV set should also have some other controls for occasional touching up: width and horizontal linearity adjustments can keep you from losing part of the display at the edges, and focus and video peaking adjustments can give you a sharper picture. These latter adjustments need touching up only rarely, so it's fine if they're on the back panel or inside. Not all TV sets have them; check a circuit diagram to be certain.

If you come across a TV with direct video and sound inputs for a video player, so much the better. You can connect your computer to them – contact the manufacturer to find out how – and get a sharper picture because the signal does not have to go through a modulator or the TV set's tuner. In fact, if you aren't interested in watching TV programs, perhaps you should buy a *monitor* – a device like a TV set without a tuner or channel selector, only a direct video input.

If your computer uses sound, make sure that the monitor has sound capability. The ones intended for use with video recorders generally do, while monitors designed for use with computers often do not. Also, there are two types of color computer monitors. Get one with a composite video input, rather than RGB direct drive, unless you are sure that the latter is what your computer requires.

When it comes to superior performance, we study our lines very carefully.

Superior printer performance is not a fluke. It evolves from analyzing printed line after printed line. Taking the time to test and retest. After 30 years of manufacturing precision parts, we know that there are no shortcuts.

And so we took the Gemini-10X and methodically put it through its 120 cps pace. We achieved a print head life of over 100 million characters with an extremely precise dot alignment creating each crisp character.

So far so good.

Next, sophisticated performance demanded versatility. A wide choice of character sets, a buffer expandable to 8K, and the ability to interface with all popular personal computers. We added macro

instruction, giving Gemini-10X the capability to perform up to 16 operations with one command. We included as standard a paper feed system that has a friction and fully adjustable tractor feed. Then we even built in the dexterity to print graphics and text on the same line.

Done.

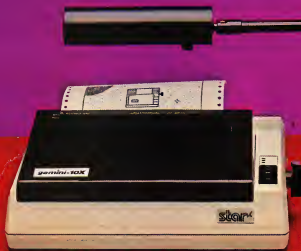
And, of course, staying the best means constant reviewing and fine-tuning. Keeping the Gemini easy to find, easy to afford and so reliable it can be warranted for up to twice as long as its major competitors.

Only the most careful engineering has built the new hard-working Gemini-10X. You'll applaud its performance.



THE POWER BEHIND THE PRINTED WORD.

Computer Peripherals Division
2803 N.W. 12th Street, Dade City, FL 34601, TX 75081



Open your mind



Reveal secrets of the mind. Use your Commodore 64 system to analyze yourself, your spouse, your date, relatives and friends. Discover your personality type, career potential, behavior tendencies, values, and the people with whom you will be most compatible. This program requires the use of a "joystick". Price \$32.95 Disk (\$27.95 Cassette).

Behavior Modification. Use your Commodore 64 system to change your behavior patterns through computer hypnosis. Discover how to communicate with yourself, on a conscious and subconscious level. Program your own post-hypnotic suggestions. The PSI Biofeedback Device is included with this program. Price \$87.95 Disk (\$79.95 Cassette).

Get this software at your local dealer or order direct from:



PSYCOM
SOFTWARE
INTERNATIONAL

2118 Forest Lake Drive
Cincinnati, Ohio 45244 USA
Telephone: 513 474-2188

that IBM's new home computer, due to be released soon, will become the archetype. The Japanese are reportedly attempting to develop a set of standards to reduce incompatibility problems in their new generation of home computers in the hope that they will come to be the standard. For now, the name of the game is caveat emptor, let the buyer beware. For any given computer there is much more incompatible than compatible equipment available.

To receive additional information from advertisers in this issue, use the handy reader service cards in the back of the magazine

NEW!

For Your TRS-80 Color Computer

128 Full-time Audio Talk/Tutor Programs!



We're Your Educational Software Source

LANGUAGE ARTS

Spelling (16 programs)
Level 3-4 (16 programs)

(words in context with definitions and synonyms)

Phonics (16 programs)

English as a Second Language (32 programs)

MATHEMATICS

Levels 1-6 Numbers (16 programs)

Basic Algebra (16 programs)

SCIENCE & TECHNOLOGY

Physics (16 programs)

In Color, with Pictures and Text!

All of our TRS-80 Color programs have easy to understand professional announcer narration, not synthesized, robotic voices. All text is displayed in easy to read upper- and lower-case characters. Video clearly illustrates key concepts in each frame of the program.

Only \$4.40 per program (\$8.80 for 2, one on each side of a half-hour cassette). \$59.00 for 16 programs (8 cassettes) in an album. Send for a catalog of over 1000 programs for Atari, TRS-80, Apple, etc.

For more information, or to order call:



TOLL FREE 1-800-654-3871

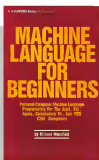
DORSETT

Educational Systems, Inc.

Box 1226, Norman, OK 73070

COMPUTE! Books

A U T U M N 1 9 8 3



\$14.95

ISBN 0-942386-11-6

Machine Language For Beginners. Much commercial software is written in machine language because it's faster and more versatile than BASIC. *Machine Language For Beginners* is a step-by-step introduction to the subtleties of machine code. Includes an assembler, a disassembler, and utilities, to help beginners write programs more quickly and easily. Covers many popular home computers.

350 pages, paperback.
Spiral bound for easy access to programs.



\$12.95

ISBN 0-942386-16-7

COMPUTE!'s Second Book Of VIC. This is just the book to follow the bestselling *First Book of VIC*; clear explanations of programming techniques, an extensive memory map, a mini-word processor, a system for creating sound effects, a custom character maker, a machine language assembler, and "Snake," an extraordinary all-machine language game.

274 pages, paperback.
Spiral bound for easy access to programs.

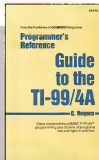


\$12.95

ISBN 0-942386-20-5

COMPUTE!'s First Book Of Commodore 64. An excellent resource for users of the 64, with something for everyone: BASIC programming techniques, a memory map, a machine language monitor, and information about writing games and using peripherals. Many ready-to-type-in programs and games.

264 pages, paperback.
Spiral bound for easy access to programs.



\$14.95

ISBN 0-942386-12-4

Programmer's Reference Guide To The TI-99/4A. Useful for everyone from beginners to experienced programmers. Contains instructions for programming in BASIC, plus more than 40 ready-to-type-in programs for this popular computer. Explanations and examples of variables, files, arrays, high-resolution graphics, music, speech, editing and debugging, conserving memory, and more.

312 pages, paperback.
Spiral bound for easy access to programs.



\$12.95
ISBN 0-942386-00-0

COMPUTE!'s First Book Of Atari. One of the most popular books for one of the most popular personal computers. Useful articles and programs include: "Inside Atari BASIC," "Adding A Voice Track To Atari Programs," "Designing Your Own Atari Graphics Modes," and more. For beginning to advanced Atari owners and users.

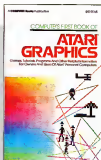
184 pages, paperback.
Spiral bound for easy access to programs.



\$12.95
ISBN 0-942386-06-X

COMPUTE!'s Second Book Of Atari. Previously unpublished articles and programs selected by the editors of **COMPUTE!** Magazine. An excellent resource for Atari users. Contains chapters about utilities, programming techniques, graphics and games, applications, and machine language.

250 pages, paperback.
Spiral bound for easy access to programs.



\$12.95
ISBN 0-942386-08-6

COMPUTE!'s First Book Of Atari Graphics. Atari programmers interested in graphics and color will find this book indispensable. Includes sections on using Atari graphics, "painting" the screen in 256 colors, mixing graphics modes, making high resolution graphs and charts, redefining character shapes, player/missile graphics, and much more.

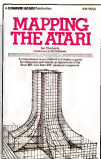
248 pages, paperback.
Spiral bound for easy access to programs.



\$19.95
ISBN 0-942386-02-7

Inside Atari DOS. An invaluable programming tool for intermediate to advanced Atari programmers who own a disk drive. Written by Bill Wilkinson, designer of Atari's Disk Operating System, this book provides a detailed source code listing. A comprehensive guide to DOS structure.

108 pages, paperback.
Spiral bound for easy access to programs.



\$14.95
ISBN 0-942386-09-4

Mapping The Atari. A "treasure map" of ROM and RAM. This book supplies a comprehensive listing of memory locations and their functions. In addition, many applications are suggested, complete with program listings. For beginning to advanced Atari owners and users.

194 pages, paperback.
Spiral bound for easy access to programs.



\$12.95
ISBN 0-942386-15-9

The Atari BASIC Sourcebook. From the computer's point of view, each BASIC command is actually a machine language mini-program. Authors Bill Wilkinson, Kathleen O'Brien, and Paul Laughton, the people who actually wrote Atari BASIC, have compiled a complete annotated source code listing and a wealth of information on the internal workings of BASIC.

296 pages, paperback.
Spiral bound for easy reference.



\$12.95
ISBN 0-942386-07-8

COMPUTE!'s First Book of VIC. The essential reference guide for owners and users of Commodore VIC-20, the computer in more homes than any other. *First Book of VIC* features games, educational programs, programming techniques, home applications, machine language, memory maps, and more.

212 pages, paperback.
Spiral bound for easy access to programs.



\$3.95
ISBN 0-942386-03-5

The Beginner's Guide To Buying A Personal Computer. This useful handbook is designed to teach the novice how to evaluate and select a personal computer. Written in plain English for prospective buyers of home, educational, or small business computers. Comes complete with personal computer specification charts and a buyer's guide to 35 computers.

90 pages, paperback.
Revised and updated 1983 edition.



\$12.95
ISBN 0-942386-13-2

COMPUTE!'s First Book Of VIC Games. Two dozen great games for just \$12.95. Each has been tested and debugged and is ready to type in. Contains a variety of action games, mazes, brain testers, dexterity games, and more. Helpful hints and suggestions explain how each game was put together, strategies for winning, and ideas for modifying the games.

201 pages, paperback.
Spiral bound for easy access to programs.



\$4.95
ISBN 0-942386-05-1

Every Kid's First Book Of Robots And Computers. This book uses turtle graphics to introduce kids to robots and computers. Includes exercises for computer graphics languages such as Atari PILOT. Additional exercises allow readers to experiment with the Milton Bradley "Big Trak™." Children who don't have a computer can use the sturdy "Turtle Tiles™" bound into each book.

Big Trak is a trademark of the Milton Bradley Company.
Turtle Tiles is a trademark of David O. Thorpe and Invention, Inc.

83 pages, paperback.



\$12.95
ISBN 0-942386-14-0

COMPUTE!'s First Book Of Atari Games. Here are fifteen commercial quality game programs, ready to type into an Atari. The book contains fast machine language games that require quick reflexes as well as brain testers that feature strategy and logic. As a bonus, many programming techniques are explained in depth, so Atari owners can adapt them to their own games.

232 pages, paperback.
Spiral bound for easy access to programs.



\$14.95
ISBN 0-942386-10-8

Home Energy Applications On Your Personal Computer. Written for homeowners who want to analyze energy costs. Includes many computer programs for adding up the costs and benefits of home improvements — weatherstripping, insulation, thermostat timers, air conditioning, storm windows, and so on. Programs will run on all popular home computers.

243 pages, paperback.
Spiral bound for easy access to programs.

New Releases October-December 1983

COMPUTE!'s First Book Of TI Games

\$12.95

ISBN 0-942386-17-5

29 ready-to-type-in games, including mazes, chase games, thinking games, creative games, and many explanations of how the programs work.

COMPUTE!'s Second Book Of Atari Graphics

\$12.95

ISBN 0-942386-28-0

Dozens of easy-to-understand explanations of rainbow graphics, animation, player-missile graphics, and more — along with artists' utilities and advanced techniques.

Creating Arcade Games On The VIC

\$12.95

ISBN 0-942386-25-6

Everything you need to know to write exciting fast-action games in BASIC on the VIC, from game design to techniques of animation, including complete example games.

VIC Games For Kids

\$12.95

ISBN 0-942386-35-3

30 games written just for kids (though adults will enjoy them too). Action games and games to teach math, geography, history — learning has never been more fun.

COMPUTE!'s First Book Of 64 Sound & Graphics

\$12.95

ISBN 0-942386-21-3

Clear explanations to help you use all the 64's powerful sound and video features. Plus great programs for music synthesis, high-res art, and sprite and character design.

COMPUTE!'s Third Book Of Atari

\$12.95

ISBN 0-942386-18-3

Continues the COMPUTE! tradition of useful and understandable information, with programs from games to a word processor. Plus utilities and reference tables.

COMPUTE!'s First Book Of Commodore 64 Games

\$12.95

ISBN 0-942386-34-5

Packed full of games: Snake Escape, Oil Tycoon, Laser Gunner, Zuzder Zee. Arcade-action machine language games for fast hands; strategy games for sharp minds.

COMPUTE!'s Reference Guide To 64 Graphics

\$12.95

ISBN 0-942386-29-9

A complete, step-by-step tutorial to programming graphics. You'll like the clear writing, the example programs, and the full-featured sprite, character, and screen editors.

Programmer's Reference Guide To The Color Computer

\$12.95

ISBN 0-942386-19-1

An essential reference. Every command in regular and extended BASIC is fully defined, with ideas and examples for using them. Plus chapters on planning programs.

Creating Arcade Games On The 64

\$12.95

ISBN 0-942386-36-1

The principles and techniques of fast-action game design, including custom characters, movement, animation, joysticks, sprites, and sound. With complete example game programs.

Commodore 64 Games For Kids

\$12.95

ISBN 0-942386-37-X

Dozens of games for kids of all ages, making this an instant library of educational software. Learning, creativity, and excitement.

Things To Do In 4K Or Less

\$12.95

ISBN 0-942386-38-8

Many entertaining and intriguing programs for small-memory computers like the unexpanded VIC, Color Computer, and TI-99/4A, with tips and hints for your own 4K programs.

Creating Arcade Games On The Timex/Sinclair

\$12.95

ISBN 0-942386-26-4

Features five ready-to-type-in games, along with the principles of game design. Also serves as an excellent introduction to BASIC programming on the Timex/Sinclair.

Coming Soon (Early 1984)

- The VIC Tool Kit: Kernal & BASIC
- Mapping The VIC
- Mapping The 64
- The 64 Tool Kit: Kernal & BASIC
- Creating Arcade Games On The TI-99/4A
- All About The 64: Volume I
- TI Games For Kids
- The Anything Machine: TI-99/4A

How To Order

All orders must be prepaid, in U.S. funds (check, money order, or credit card). NC residents add 4% sales tax. Please allow 4-6 weeks for delivery.

Send prepaid orders (including \$2 shipping/handling for each book) to

COMPUTE! Books
P.O. Box 5406
Greensboro, NC 27403

Or call

TOLL-FREE
800-334-0868
(919-275-9809 in NC)
between 8:30 AM and 4:30 PM, EST, Monday-Friday

Commodore 64 and VIC 20 are trademarks of Commodore Business Machines and/or Commodore Electronics, Ltd. Atari is a trademark of Atari, Inc. TI-99 is a trademark of Texas Instruments.

COMPUTE! Publications, Inc. 
One of the ABC Publishing Companies

Guest Commentary

The High Cost Of Personal Telecommunications

Robert Braver

As telecommunication becomes an increasingly important aspect of home computing, the telephone rates and hookup fees are of interest to both the consumer and the telephone companies. Robert Braver, President of the Oklahoma Modem Users Group, raises some important issues in this guest commentary. We contacted Southwestern Bell of Oklahoma, and the remarks of their spokesperson are included.

Sometime in mid-May, 1983, I called my local Bell business office to request that a trace be placed on my bulletin board system's phone line. Someone had been calling up my system and tying it up for an hour at a time by sitting at the prompt which asks for a user ID number.

When requesting a trace, you must describe the type of calls you have been receiving. I thought that since these calls were not voice messages, there would more than likely be confusion when I tried to explain things to the business office representative. I expected to need about half an hour to explain exactly what a modem and bulletin board system is. After all, I had to do that when I first had the phone line installed a year ago.

There Must Be Some Mistake

To my surprise, she seemed to know all about modems. In fact, she informed me that since I used a modem on my phone line, I would have to pay a higher monthly phone rate.

Of course, I thought she must be mistaken. Perhaps she was referring to the "Data Perfect" lines, which are used for high-speed (2400 baud) transmissions. I didn't need a special line for my relatively slow 300 baud modem. Even 1200 baud modems do fine on ordinary phone lines.

After about two weeks of arguing with Bell business office representatives, insisting that there must be some mistake, I received a copy of a tariff

sheet from the Oklahoma Corporation Commission. Bell was right. Their tariffs do call for the charging of a higher rate for connecting a computer using a modem to the phone lines.

This section of Southwestern Bell's Oklahoma tariffs, called Information Terminal Service tariffs, was written in the mid-sixties. Obviously, this was long before there were home computers. When the tariffs were written, generally the only modem users were large corporations transmitting data 24 hours a day. Therefore, the rates for having a computer or similar device connected to the phone lines with a modem were somewhat higher.

Because there were no home computers when the tariffs were written, Bell had no reason to distinguish between commercial and residential modem use. And now, almost 20 years later, Southwestern Bell is using those tariffs to charge personal computer users *five times* their normal phone rate if they wish to use modems with their personal computers.

An Organized Response

Since this tariff would seriously inhibit home modem use in Oklahoma, I immediately organized the Oklahoma Modem Users Group, or OMUG, to challenge Southwestern Bell and its unfair tariff.

OMUG's main goal is to organize the modem users of Oklahoma and to undertake whatever legal proceedings are deemed necessary to force Bell to exempt home modem users from the Provisions of Information Terminal Service tariffs.

As of this writing, legal proceedings are still in the future. OMUG has recently been raising funds and attempting to gain the support of home computer and modem manufacturers. OMUG has also been publicizing the situation to make sure that all modem users nationwide as well as

**WE UNLEASH THE
POWERFUL GRAP**



THE WORLD'S MOST AMAZING GRAPHICS TECHNOLOGY.

You'll never see Infocom's graphics on any computer screen. Because there's never been a computer built by man that could handle the images we produce. And, there never will be.

We draw our graphics from the limitless imagery of your imagination—a technology so powerful, it makes any picture

that's ever come out of a screen look like graffiti by comparison. And nobody knows how to unleash your imagination like Infocom.

Through our prose, your imagination makes you part of our stories, in control of what you do and where you go—yet unable to predict or control the course of

events. You're confronted with situations and logical puzzles the like of

which you won't find elsewhere. And you're immersed in rich environments alive with personalities as real as any you'll meet in the flesh—yet all the more vivid because they're perceived directly by your mind's eye, not through your external senses. The method to this magic? We've found the way to plug our prose right into your psyche, and catapult you into a whole new dimension.

Take some tough critics' words about our words. *SOFTALK*, for example, called *ZORK® III*'s prose

"far more graphic than any depiction yet achieved by an adventure with graphics." And the *NEW YORK TIMES* saw fit to print that our *DEADLINE™* is "an amazing feat of programming." Even a journal as video-oriented as *ELECTRONIC GAMES* found Infocom prose to be such an eye-opener, they named one of our games their Best Adventure of 1983.

Better still, bring an Infocom game home with you. Discover firsthand why thousands upon thousands of discriminating game players keep turning everything we write into instantaneous bestsellers.

Step up to Infocom. All words. No graffiti. The secret reaches of your mind are beckoning. A whole new dimension is in there waiting for you.



INFOCOM®

The next dimension.

Infocom, Inc., 55 Wheeler St., Cambridge, MA 02138

For more: Apple II, Atari Commodore 64, CP/M ® DEC Rainbow
DEC RT-11 IBM NEC APC NEC PC 8086 Osborne TI Professional
TRS 80 Model I, TRS 80 Model III

the general public know about this problem.

Not Limited To Oklahoma

This situation, it turns out, may not be unique to Oklahoma. There are similar outdated tariffs in other states. And many experts in the industry seem to think that if Southwestern Bell is justified in charging higher rates to modem users in Oklahoma, it is just a matter of time before other states adopt similar tariffs or start enforcing their present tariffs (also written in the sixties).

According to the tariff, anyone connecting "customer-provided data transmitting and receiving equipment that processes data and/or performs calculations" including computers, associated buffering devices, and/or concentrating devices with store and forward capabilities would all be subject to the higher rate. Although dumb terminals do not fall under the tariff, computers emulating dumb terminals do. And anyway, most terminal software packages have memory buffers, auto-logout capabilities, and other features. Furthermore, most so-called dumb terminals on the market today have memory buffers and microprocessors, which cause them to also fall under the tariff.

Information Terminal Service is considered a business service. Therefore, as of July 11, 1983 (when Bell raised my rate), if I have a problem with the modem line, I don't call the residential division, but the business division of the Bell business office. As a "business," I am entitled to a free yellow pages listing in the telephone directory. But since I do not run a business, and having the ad might hamper chances of obtaining a court order to restore my old rate, I declined the free listing.

But even without the yellow pages listing, I was told by the manager of the Bell business office that once a line is classified as a business, it cannot be restored to residential status. I would have to have the line disconnected, and pay \$80 to have a new number installed.

Is The Phone Company Justified?

Bell seems to think that its tariff is perfectly justified. Southwestern Bell's Rate and Separations Division Manager Charles Sutter spoke to a group of 40 home computer owners here in Oklahoma City in response to the outrage over the tariff. He was asked how Bell could justify charging a personal computer owner who uses CompuServe once a week the same rate as a large corporation transmitting data 24 hours a day. Sutter replied, "Well, I don't know how much you use your modem."

There is no physical justification for an additional charge for modems. Modems operating at speeds of up to 1200 baud do not require special

lines. The four frequencies that 300 baud modems use are among the frequencies in human speech, and easily fall between the 300-3000 Hz bandwidth of an ordinary telephone line.

And for most modem users, on-line time doesn't increase phone usage any more than having a teenager does.

But Bell persists in charging the higher rate. Although representatives claim that Bell is not actively pursuing computerists with modems, anyone who follows the law and registers his modem with the phone company will be immediately notified of the extra charge.

The Phone Company Replies

In response to the issues raised here concerning the extra charges imposed on modem users, Walt Beiter, an official of Southwestern Bell of Oklahoma, told us: "With the spread of computer terminals in the home, we recognize that the situation has changed. We're going to redesign our rates." The old rate schedule "didn't specify home, business, whatever. But we do realize that the conditions have changed. We've filed an application and expect to have hearings on this issue this fall."

In the Oklahoma City and Tulsa areas, we have a flat-rate system for phone billing. We pay a basic flat rate of \$8.95 for a residential phone line. This allows you to dial anywhere in the local calling area at no additional charge. If you want to attach your computer to the phone lines via a modem, that flat rate jumps to \$45.90. Also, the additional monthly charge for Touch-Tone dialing almost triples from \$1.25 to \$3.50.

On top of the additional monthly rates, Southwestern Bell also retroactively charged me the difference between a business and residential phone installation because they "should have charged [me] for a business installation in the first place. [They] made a mistake."

It is my opinion that if they charge me this rate, they must also charge everyone else who falls under the tariff. If they do start actively enforcing the tariff, which they have the capability to do, there wouldn't be much modem use in Oklahoma. And modem sales in the state would almost cease entirely.

If Oklahoma is just a test, and no one takes any concrete, effective action, there is a good possibility that this is just the beginning of unreasonable charges for personal telecommunication. ☐

... At The Lowest Cost The New ClipperTM

Dymarc's new Clipper is the maximum protection surge suppressor with advanced circuits and features you won't find in the competition. The Clipper gives you three fully protected outlets that stop surges.

At the suggested retail price of \$49.95, Dymarc has incorporated all the proven quality features of the Clipper plus fail safe audible beeper to protect your computer investment.

Tested under UL 1449 for surge suppression, Dymarc's exclusive circuit design is listed with UL for both common and normal mode protection.

The \$49.95 price includes a full one year warranty so the next time you go looking for surge protection, shop smart and get the most for your money. Get Dymarc's new Clipper.



For the Dymarc dealer
nearest you,
call toll-free:
800/638-9098

DYMARC
INDUSTRIES, INC.

21 Governor's Ct., Baltimore, MD 21207

Plug Into Dymarc Computer Protection.



Stock Market Analyzer

Donald Thompson

Do you invest in stocks or bonds? If you like to play the stock market, this program, originally written for the Commodore 64 or 8K-expanded VIC, can help you monitor your investments more carefully – even helping you decide when to sell or buy. An Atari version is included. Of course no stock investment plan is fool-proof. You might want to try this program out by playing the market on paper before putting down any real money to see if it fits your investment psychology.

Managing your stock investments can be a full-time job. "Stock Market Analyzer" provides the means to watch the progress of various stocks and record purchases and sales. The program includes a graph of the stock's price fluctuations and a guide to whether you should buy or sell a stock at any particular time. You can also see a list of transactions for each year for your tax records.

The theory behind this program is that as stocks fluctuate, the best way to invest is to put only half as much as you otherwise would in a given stock. If the stock goes up, you make money. If the stock goes down, it becomes an even better buy, so you can then invest some of the money that you have in reserve.

Using The Options

Using Stock Market Analyzer is fairly easy. After typing in the program, SAVE it to tape or disk and then type RUN. A listing of stock abbreviations will appear at the top of the screen, and you'll see seven options:

- 1 Search one stock
- 2 List stocks for any one month
- 3 Update DATA statements for new month

- 4 Buy or sell advice
- 5 Store data for transactions
- 6 Graph progress of any of your stocks
- 7 List transactions by year for tax purposes

Sample stock entries are included in the program. It is a good idea to run the program with the examples before entering the data for your own portfolio. Doing this will give you a better idea of how the program works. You can then enter your own stock symbols, number of shares, and initial cost in place of the sample entries.

You must update each stock price once a month or after each transaction. Before you update a stock price, make sure that you have included the necessary background data for the stock (lines 500-549). The information required for these lines is stock symbol, number of shares you have purchased (0 if you wish only to monitor the stock price), and net cost for the stock (again, 0 for monitoring only). Also set Y (in line 549) equal to the number of stocks being considered. Once you have entered this data, save the program and run it whenever you wish to update monthly stock prices or transactions.

To update monthly stock prices, run the program and use option three to produce DATA statements. Press Y in response to the INPUT DATA prompt, and press RETURN over the data lines which appear on the screen. To update stock transactions, use option five to produce DATA statements. Again, press RETURN over the printed data lines. The DATA statements from these two options are in two forms. DATA statements based on monthly updates store the date for month and year. The DATA statements based on stock transactions store the date including year,

Calc Result

The Commodore 64™ Spreadsheet that puts you a million miles ahead

CALC RESULT. The one spreadsheet guaranteed to turn your Commodore into a powerful financial tool. Offering you every feature found on other more expensive programs for much less the cost.

Flexible... you can view four different areas at once

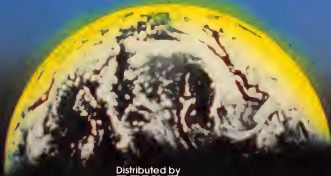
Versatile... customize your own print formats

Distinctive... display beautiful color graphics

CALC RESULT Advanced is a three-dimensional spreadsheet with built-in HELP function and 32 pages of memory. For the Commodore 64 \$149.95. For the CBM™ 8032 \$199.00.

For first time users **CALC RESULT Easy** gives you a fast way to perform financial calculations—easily. For the Commodore 64 \$79.95.

For a down to earth demonstration of either version visit your local dealer today.



handic
software ab

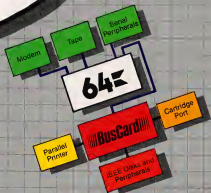
-a company in the Datatronic group-

Distributed by
**Computer
Marketing
Services, Inc.**

300 W. Marlton Pike, Cherry Hill, NJ 08002
609 795 9480

Commodore 64 is a trademark of Commodore Business Machines

THE COMMODORE 64 WORK FORCE.



BusCard™ NEW!

BusCard allows you to expand the capabilities of your Commodore 64. It gives you easy to use "BASIC 4" commands and the fast IEEE interface for access to the Commodore Business Machines line of peripherals, including high capacity dual drives and hard disk systems. Unlike other interfaces,

BusCard is fully compatible with software. No need to buy a printer interface — BusCard includes a Centronics printer port. Serial and user ports remain available for modem and serial peripherals. Plus: machine language monitor, complete documentation and a one year warranty.

\$199



PaperClip™
Professional Word Processor
For Commodore 64 and CBM/SuperPet

"Absolutely the most versatile word processor I have seen."
Midnight Software Gazette March/April, 1983

"... a very powerful word processor, with so many features that most people only need a fraction of them."
COMPUTE! April, 1983

So easy to use that even novices can get professional results.

PaperClip has every standard word processor function, plus many exclusive features, including horizontal scrolling for charts and wide reports, up to 250 columns, column moves, alphanumeric sorts and arithmetic. Works with 80 column cards and every popular printer, with instant printer set-up. Professional handling of form letters, mail list merge, and large documents.

Complete, professional and easy to use. No where else will you find PaperClip's capabilities at this breakthrough price.

\$125



Delphi's Oracle **NEW!**
Professional Data Base Management
For Commodore 64 and PET/CBM

Delphi's Oracle is a powerful information handling program that allows you to enter, retrieve and update data with incredible speed and flexibility.

- Large record size (over 8000 characters) • Up to 99 fields and 9 display pages per record • Includes report writer and mail label printing • Design your own forms on the screen or on printed reports

Delphi's Oracle brings power and versatility usually found only in mainframe or minicomputer systems, with provision for safeguarding accurate data entry, and excellent flexibility in searching for records.

\$150

BATTERIES INCLUDED



Batteries Included, U.S.A.
Los Angeles, California
(213) 566-2875

CBM Systems
Van Nuys, California
(213) 904-0111

Kapri International
Sun Valley, California
(213) 766-2774

Software Distributors
Calver City, California
Cal (800) 252-4025

Software International
Upland, California
(714) 981-7640

Lightware Computer
Yakima, Washington
(509) 875-5807

R & S Micro Services
Minneapolis, Minnesota
(612) 566-7566

City Software
Milwaukee, Wisconsin
(414) 277-1230

AB Computers
Olmsted, Pennsylvania
(215) 822-7767

CSI Distributors, Inc.
Spring Valley, New York
(914) 352-6700

Bob Neff & Assoc.
Greenville, South Carolina
(803) 269-9540

Batteries Included
Toronto, Ontario
(416) 596-1406

month, and day. This difference allows the program to distinguish between monthly updates and transactions. If you want to clear out the oldest DATA, then, in immediate mode, type GOTO 20040. Each time the routine beginning at this line is executed, the first three DATA statements containing the earliest stock data will be deleted.

Keep in mind that the program is designed to monitor the cost factor involved in buying and selling stocks, as well as the actual purchase price of a stock. Under normal circumstances, transactions under \$300 are not practical since such transactions include high brokerage fees.

Buy and sell advice is activated when the stock moves outside a range of values, which is determined in the subroutine beginning in line 850.

There is, of course, no perfect method to guide investors in trading in the stock market. Stock Market Analyzer is simply an aid to help you keep track of your investments and to offer an alternative way of making choices.

Program 1: Stock Market Analyzer - VIC (8K)/64 Version

```

10 PRINT"{CLR}STOCK MARKET ANALYZER"
12 FORX=1TO500:NEXT
15 DIMS$(50),FF(50),P(50),SA(50),R$(50),T
  P(50)
30 PRINT"{CLR}":T=0:GOSUB500
32 PRINT"{CLR}THESE ARE THE STOCKS I HAVE
  IN MEMORY"
35 FORX=1TOYSTEP2
40 PRINTS$(X),TAB(5)SS(X+1):NEXTX
45 Q=0
50 C=0:T=0
60 F=1022
95 PRINT"CHOICES AVAILABLE HIT":PRINT
96 PRINT"SEARCH STOCK{8 SPACES}1"
97 PRINT"STOCKS AT A DATE{4 SPACES}2"
98 PRINT"MONTHLY STK PRICES{2 SPACES}3"
99 PRINT"BUY OR SELL ADVICE{2 SPACES}4"
100 PRINT"STORE BUYS/SALES{4 SPACES}5"
101 PRINT"GRAPH A STOCK{7 SPACES}6"
102 PRINT"TRADES IN ANY{2 SPACES}YEAR 7"
105 GETQ:IFQ=0THEN105
106 ONOGOTO110,200,300,400,700,920,650
107 GOTO30
110 INPUT"WHICH STOCK";AS
111 RESTORE
112 GOSUB900
120 FORX=1TO1000
130 READAA$,BB$,CC$,DD$,EE$,FF$,GG
140 IFAA$=AA$THENGOSUB800
150 IFAA$="XXXX"THENX=1000:NEXTX:GOTO160
155 NEXTX:GOTO160
160 PRINT:PRINT"[5 SPACES]HIT ANY KEY "
170 GETB$:IFB$=""THEN170
180 GOTO30
200 PRINT
205 RESTORE
210 PRINT"STOCKS-DATE YRMM":INPUTD$
215 IFLen(D$)<4THEN210
216 D=VAL(D$):GOSUB900
220 FORX=1TO1000
221 READAA$,BB$,CC$,DD$,EE$,FF$,GG
222 IFBB$=DTHENBB$=STR$(BB):GOSUB800
226 IFAA$="XXXX"THENX=1000:NEXTX:GOTO240
228 NEXTX
240 PRINTTAB(5)"TOTAL IS";T:PRINT"
  {5 SPACES}HIT ANY KEY"
241 GETB$:IFB$=""THEN241
242 GOTO300
300 PRINT"[CLR]{2 DOWN}TO CALCULATE TODAY
  'S{2 SPACES}VALUES AND CREATE DATA ST
  ATEMENTS I NEED"
306 GOSUB500
307 PRINT"THESE ARE THE STOCKS I HAVE HIT"
308 PRINT"YOU HAVE";Y;"STOCKS-"
309 PRINT"FROM STOCK# TO STOCK#":INPUTT,U
310 FORX=TTOU
312 PRINT"PRICE OF{4 SPACES}";SS(X)
315 INPUTP(X)
320 NEXTX:PRINT"[CLR]{4 DOWN}"
325 FORX=TTOU
330 GR$="":GR$=STR$(F)+"DATA "+SS(X)+","+
  STR$(G)+",H,0,0,"+STR$(FF(X))+","
335 PRINT GR$+STR$(P(X))
338 F=F+1
339 PRINT
340 NEXTX
345 PRINT"60 F=";F:PRINT"RUN
350 PRINT"HIT Y TO INPUT DATA"
351 GETT$:IFT$=""THEN351
355 IFT$="Y"THENPRINT"[HOME]":END
356 GOTO300
400 PRINT"[CLR]{3 DOWN}THE PATTERN FOR RE
  COMMENDING SALES IS BASED ON INCREAS
  ING AND "
401 PRINT"DECREASING PRICES"
405 PRINT"THESE ARE THE STOCKS I HAVE HIT"
410 FORX=1TOY
411 PRINT"[DOWN]{2 RIGHT}"
412 PRINTS$(X);:PRINT"[2 SPACES]THESE PR
  ICE=":INPUTP(X)
415 NEXTX
420 FORX=1TOY
425 GOSUB850
440 PRINTS$(X);"[2 SPACES]";R$(X);"
  {2 SPACES}";MR
445 IFR$="H"THEN PRINT"NO TRADE RECOMM
  ENDED"
450 NEXTX
480 PRINT"DONE{DOWN} HIT ANY KEY"
485 GETZ$:IFZ$=""THEN485
490 GOTO300
500 SS(1)="AGOL":FF(1)=600:SA(1)=3375
501 SS(2)="TRUMP":FF(2)=200:SA(2)=726.6
503 SS(3)="EAL":FF(3)=0:SA(3)=0
504 SS(4)="SEAG":FF(4)=100:SA(4)=9280
505 SS(5)="CASH":FF(5)=1:SA(5)=55
506 SS(6)="PLYT":FF(6)=100:SA(6)=3020
507 SS(7)="SMKV":FF(7)=1000:SA(7)=5220
549 Y=7
550 RETURN
601 PRINT"[HOME]{17 DOWN}";
610 FORS=1TOX:PRINT"[RIGHT]";:NEXTS
615 IFHI=0THENGOTO640
620 FORT=1TOINT(15/HI)*TP(X):PRINT"[UP]";
  :NEXTT
625 IFS>20THENPRINT"[UP]";:GOTO20040
630 PRINT"*";
635 PRINT"[HOME]"
640 RETURN
650 RESTORE

```

Nightraiders

Fantastic
action game
for Atari*

The elite corps known as the Nightraiders are trying to bring freedom to a conquered earth. Since they are few in number, compared to the enemy, they must operate under the cloak of darkness. As the group's leader, your mission is to fly over enemy strongholds . . . identify targets of opportunity and destroy them thoroughly.

While the invaders cannot mount an air attack after the sun has set they do have weapons of awesome power . . . weapons which relentlessly track your flightpath and anticipate your movements.

Success does not come easy. You must be able to maneuver like the crack of a whip . . . accelerate and decelerate in and out of hyperdrive . . . while carefully lining up the targets for your twin ion bombs. And always keep an eye on the special radar screen which spots enemy action for you.

Become a Nightraider and meet the most fascinating challenge of your space career!

\$29.95/Atari*

400/800 with
Disk Drive
and joystick

At your computer store, or from:

 **DATAMOST**

8943 Fullbright Ave.,
Chatsworth, CA 91311

VISA/MASTERCARD accepted \$2.00
shipping/handling charge (California
residents add 6 1/2% sales tax.)

*Atari is a registered trademark of Atari,
Inc.

DAY
MUST TURN TO NIGHT
BEFORE MANKIND
DARES TO FIGHT

```

652 PRINT"YEAR OF PORTFOLIO-YR":INPUT,D
654 IFD=0THEN210
656 GOSUB9000
658 FORX=1TO1000
660 READA$,B$,C$,D$,E$,F$,G$
662 IFD=INT(B$/(10000))THENGOSUB9000
664 IFAA$="XXXX"THENGOTO680
666 NEXTX
670 GOTO700
675 C=0:GETD$:IFD$=""THEN675
676 GOTO660
680 PRINTTAB(5)*[4 SPACES]HIT ANY KEY "
681 GETB$:IFB$=""THEN681
685 GOTO30
700 PRINT"[CLR][3 DOWN]STORING NEW TRANSACTIONS"
710 PRINT"THERE ARE SEVERAL LINE STATEMENTS THAT MUST BE CHANGED"
725 PRINT"TODAYS DATE-YMMDD":INPUT DA
728 PRINT"WHICH STOCK":INPUTSO$
730 PRINT"BUY(B)[2 SPACES]OR SELL(S)":INPUT[2 SPACES]S$
735 PRINT"HOW MANY SHARES":INPUT SH
737 PRINT"WHAT PRICE":INPUT P
741 FORX=1TOY:IFSO$=S$(X)THENTE=X:X=Y:NEXTX:GOTO745
742 NEXTX
745 INPUT"NET COST OR PROCEEDS":NP
747 IF S$="B"THEN NW=SA(TE)+NP:NF=FF(TE)+SH:GOTO 750
748 NW=SA(TE)-NP:NF=FF(TE)-SH
750 PRINT"FP(X) BETWEEN 500-600 IS":NF
752 PRINT"SA(X) SHOULD BE":NW
755 PRINT"IT SHOULD BE ABOUT":TE-1;"DOWN"
756 GR$="":GR$=STR$(F)+DATA "+SO$+"+"ST R$(DA)+""+"S$+"+"STR$(SH)
757 GR$=GR$+"+"STR$(NP)+""+"STR$(NF)+""+"STR$(P)
760 PRINTGR$
768 PRINT"60 F=":F+1
770 PRINT"RUN
775 PRINT"HIT ANY KEY BUT N TO ENTER DATA "
780 GETY$:IFY$=""THEN780
782 IFY$="N"THEN780
783 END
800 REM ROUNDING
801 DD$=STR$(DD):FF$=STR$(FF):IFLEN(DD$)=1THENDD$=DD$+"[2 SPACES]"
802 L=E:GOSUB30000:EE$=JS$:IFLEN(FF$)=2THENFF$=FF$+" "
803 IFLEN(DD$)=2THENDD$=DD$+"{SHIFT-SPACE}"
804 L=G:GOSUB30000:GG$=JS$:IFLEN(FF$)=1THENFF$=FF$+"[2 SPACES]"
805 L=INT(FF*GG):GOSUB30000:HH$=JS$
808 PRINT"STOCK[2 SPACES]":AA$:PRINT"DATE [3 SPACES]":BB$:PRINT"BUY/SELL ":CC$:PRINT"NUM[3 SPACES]":DD$:
809 PRINT"$NET[3 SPACES]":EE$:PRINT"CUR[2 SPACES]":FF$:PRINT"MARKET ":GG$:PRINT"VALUE[2 SPACES]":HH$
810 PRINT"HIT SHIFT TO CONTINUE"
811 IF(PEEK(653)AND1)=0THEN811
812 PRINT"[CLR]"
815 T=T+FF*GG
820 RETURN
850 MP=FF(X)*P(X):R$(X)="H":MR=0
855 IFMP>SA(X)*1.1THENR$(X)="S":MP=MP-MP*0.1:MR=MP-SA(X)
856 IFMP<SA(X)*.9THENR$(X)="B":MP=MP+MP*0

```

```

1:MR=SA(X)-MP
858 IF (MR<300) AND (MR>-300) THEN R$(X)="H"
865 RETURN
900 PRINT"[CLR]"
901 RETURN
920 INPUT"WHICH STOCK":WH$:V=0:RESTORE
925 FORX=1TO1000
930 READA$,B$,C$,D$,E$,F$,G$
932 IFB=10000THEN940
935 IFWH$=A$THENV=V+1:TP(V)=G
936 IFA$="XXXX"THENGOTO945
940 NEXTX
945 REM-CREATE GRAPH
946 I=1:HI=0:LP=10
950 FORX=1TOV
951 IFHI<TP(X)THENHI=TP(X)
952 IFLP>TP(X)THENLP=TP(X)
953 NEXTX
960 PRINT"[CLR][3 DOWN]"
962 FORX=1TO13:PRINTCHR$(102):NEXTX
964 FORX=1TO20:PRINTCHR$(102):NEXTX
970 FORX=1TOV
975 GOSUB601
980 NEXTX
981 PRINT"[HOME]HIGH "HI;" LOW":LP
982 PRINT"[3 RIGHT]STOCK IS "WH$
983 PRINT"[15 DOWN]":FORX=1TOV:PRINTTP(X);:NEXTX
990 GETQQ$:IFQQ$=""THEN990
995 GOTO30
1000 DATA AGOL, 8301,H,0,0, 500, 5.5
1001 DATA TRVMP, 8301,H,0,0, 200, 4
1002 DATA EAL, 8301,H,0,0, 0, 6.5
1003 DATA SEAG, 8301,H,0,0, 100, 95
1004 DATA CASH, 8301,H,0,0, 1, 55
1005 DATA FLYT, 8301,H,0,0, 100, 35
1006 DATA SMKV, 8301,H,0,0, 1000, 5.5
1007 DATA AGOL, 8302,H,0,0, 500, 6
1008 DATA TRVMP, 8302,H,0,0, 200, 5
1009 DATA EAL, 8302,H,0,0, 0, 7
1010 DATA SEAG, 8302,H,0,0, 100, 100
1011 DATA CASH, 8302,H,0,0, 1, 50
1012 DATA FLYT, 8302,H,0,0, 100, 39
1013 DATA SMKV, 8302,H,0,0, 1000, 6
1014 DATA AGOL, 8303,H,0,0, 500, 4.5
1015 DATA TRVMP, 8303,H,0,0, 200, 6
1016 DATA EAL, 8303,H,0,0, 0, 4
1017 DATA SEAG, 8303,H,0,0, 100, 85
1018 DATA CASH, 8303,H,0,0, 1, 43
1019 DATA FLYT, 8303,H,0,0, 100, 37
1020 DATA SMKV, 8303,H,0,0, 1000, 7
1021 DATA AGOL, 830403,H, 100, 775, 600, [SPACE]7.5
20000 DATA XXXX,X,X,0,0,0,0,0
20030 REM A SHORT PROGRAM TO CLEAN OUT LINES OF DATA USING SCREEN EDITOR
20040 PRINT"[CLR][2 DOWN]"
20050 S=1000
20100 FORX=STOS+2:PRINTX:NEXTX
20110 PRINT"20050[2 SPACES]S="X
20115 PRINT"[HOME]"
20370 POKE190,5
20375 FORI=1TO5:POKE631+I,13:NEXT:END
30000 L=INT(L*100+.005)/100:JS$=STR$(L):J$=MID$(J$,2,2)
30010 JL=LEN(J$):IFJL>2THENIF MID$(J$,JL-2,1)=".":GOTO30040
30020 IFJL>1THENIFMID$(J$,JL-1,1)=".":THE NJ$=J$+"0":GOTO30040
30030 JS$=J$+"00"

```

A million laughs

SPARE CHANGE™ You are the game-happy owner of the Spare Change Arcade. Two fun-loving, but overworked Zerk—the main characters in your most popular game—have broken loose and are trying to retire from the business. You try madly to stop them. If you can get a coin into the juke box, the Zerk get so caught up in the music, they drop everything and start dancing. You also try popping popcorn and making a pay phone ring—which immediately makes the Zerk stop, answer and start a wild conversation. If you "win" the game, there are rib tickling cartoons by the Zerk to reward your efforts. It's a game full of sight gags, surprises and comedy. From the best. Brøderbund! For the Apple® II, II+ and IIe. Coming soon for the Atari® home computers in disk format.



and an endless challenge



LODE RUNNER™ Here's a game that will never stop challenging you. That's because Lode Runner is more than a spellbinding, fast-action game with its 150 different mind-boggling game screens. Lode Runner is also an easy-to-use Game Generator that lets you create your own games. Without any knowledge of programming, you can easily design unique Lode Runner screens, then bring them to action-packed life. You will maneuver through scene

after scene, running, jumping, drilling passages and outfoxing enemy guards in a secret underground hide-away as you pick up chests of gold stolen from citizens of the Bungeling Empire. There's no end to the thrills, chills and challenge. Of course, it's from Brøderbund! For the Apple II, II+ and IIe. Coming soon for the: Atari home computers (disk and cartridge); Atari 5200™ Super System; Commodore 64™; VIC-20™; IBM® PC.



Ask your Brøderbund dealer for sneak previews.



Brøderbund Software Discover the Difference

17 Paul Drive San Rafael, CA 94903

Apple II, II+, IIe are registered trademarks of Apple Computer, Inc. ATARI 400/800/1300 and 5200, Commodore 64 and VIC-20 and IBM are trademarks of Atari, Inc., Commodore Electronics, Ltd., and International Business Machines Corporation, respectively.

```

30040 IF LEFT$(JSS,1)="." THEN JSS="0"+JSS
30050 RETURN

```

Program 2: Stock Market Analyzer — Atari Version

```

5 DIM AA$(10), BB$(10), CC$(10), DD$(10)
  , EE$(10), FF$(10), GG$(10), HH$(10),
  , JSS$(10), TT$(10), SO$(10), A$(10), D$(
  6)
7 DIM WH$(10), SS$(10), C$(10)
10 GRAPHICS 0:POKE 752,1:POSITION 9,
  10:PRINT "STOCK MARKET ANALYZER":
  FOR W=1 TO 900:NEXT W
15 OPEN #1,4,0,"K:"
25 DIM S$(500),SL(50),FF(50),P(50),S
  A(50),R$(50),TP(50)
30 PRINT "(CLEAR)":POKE 752,0:T=0:GO
  SUB 500
32 PRINT "(CLEAR)THESE ARE THE STOCK
  S I HAVE IN MEMORY":PRINT
35 X1=2:Y1=2:FOR X=1 TO Y
40 POSITION X1,Y1:PRINT S$(X*10+1,X*
  10+SL(X))
42 IF X=7 OR X=14 THEN X1=X1+10:Y1=1
45 Y1=Y1+1:NEXT X:O=0
50 C=0:T=0
60 F=1022
95 POSITION 2,11:PRINT "CHOICES AVAIL
  ABLE       ":PRINT
96 PRINT "SEARCH STOCK(B SPACES)1"
97 PRINT "STOCKS AT A DATE
  (4 SPACES)2"
98 PRINT "MONTHLY STK PRICES 3"
99 PRINT "BUY OR SELL ADVICE 4"
100 PRINT "STORE BUYS/SALES
  (4 SPACES)5"
101 PRINT "GRAPH A STOCK(7 SPACES)6"
102 PRINT "TRADES IN ANY YEAR 7"
105 GET #1,A:Q=A-40
106 ON Q GOTO 110,200,300,400,700,92
  0,650
107 GOTO 30
110 ? "WHICH STOCK":INPUT A$
111 RESTORE
112 GOSUB 900
120 FOR X=1 TO 1000
130 READ AA$,BB$,CC$,TT$:DD=VAL(TT$)
  :READ TT$:EE=VAL(TT$):READ TT$:F
  F=VAL(TT$):READ TT$:GG=VAL(TT$)
140 IF A$=AA$ THEN GOSUB 800
150 IF AA$="XXXX" THEN X=1000:NEXT X
  :GOTO 160
155 NEXT X:GOTO 160
160 PRINT:PRINT "(5 SPACES)HIT ANY
  KEY "
170 GET #1,A
180 GOTO 30
200 PRINT
205 RESTORE
210 PRINT "STOCKS DATE YRMM":INPUT D
  $
215 IF LEN(D$)<>4 THEN 210
216 D=VAL(D$):GOSUB 900
220 FOR X=1 TO 1000
221 READ AA$,BB$,CC$,TT$:DD=VAL(TT$)
  :READ TT$:EE=VAL(TT$):READ TT$:F
  F=VAL(TT$):READ TT$:GG=VAL(TT$)
222 BB=VAL(BB$)
223 IF BB=D THEN GOSUB 800

```

```

226 IF AA$="XXXX" THEN X=1000:NEXT X
  :GOTO 240
228 NEXT X
240 PRINT "TOTAL IS ";T:PRINT "
  (5 SPACES)HIT ANY KEY"
241 GET #1,A
242 GOTO 30
300 PRINT "(CLEAR){2 DOWN}TO CALCULA
  TE TODAY'S VALUES AND":PRINT "CR
  EATE DATA STATEMENTS I NEED"
306 GOSUB 500
307 PRINT "TODAY'S DATE (YRMM)":INPUT
  T$
308 PRINT "YOU HAVE ";Y;" STOCKS-"
309 PRINT "FROM STOCK# TO STOCK#":IN
  PUT T,U
310 FOR X=T TO U
312 PRINT "PRICE OF ";S$(X*10+1,X*1
  0+SL(X))
315 INPUT ZZ:P(X)=ZZ
320 NEXT X:PRINT "(CLEAR){4 DOWN}"
325 FOR X=T TO U
335 PRINT F;"DATA":S$(X*10+1,X*10+SL
  (X))";","G";H,0,0,"FF(X)";","P
  (X)
338 F=F+1
339 PRINT
340 NEXT X
345 PRINT "60 F=";F:PRINT "RUN"
350 PRINT "HIT Y TO INPUT DATA"
351 GET #1,A
355 IF A=ASC("Y") THEN POSITION 2,0:
  END
356 GOTO 300
400 PRINT "(CLEAR){3 DOWN}THE PATTEN
  N FOR RECOMMENDING SALES IS BASE
  D ON INCREASING AND DECREASING"
401 PRINT "PRICES.(DOWN)"
405 PRINT "TODAYS PRICES ARE"
410 FOR X=1 TO Y
411 PRINT "? ? ?"
412 PRINT S$(X*10+1,X*10+SL(X))":PRI
  NT " TODAYS PRICE=":INPUT ZZ:P(
  X)=ZZ
415 NEXT X
420 FOR X=1 TO Y
425 GOSUB 850
440 PRINT S$(X*10+1,X*10+SL(X))";"
  "
  :R$(X,X)";(3 SPACES);MR$;"
  (4 SPACES)"
445 IF R$(X,X)="H" THEN PRINT "(UP)
  (15 RIGHT)NO TRADE RECOMMENDED"
450 NEXT X
480 PRINT "DONE":PRINT:PRINT "HIT A
  NY KEY TO CONTINUE"
485 GET #1,A
499 GOTO 30
500 S$(11)="ABOL":SL(1)=4:FF(1)=600:
  SA(1)=3375
501 S$(21)="TRVMF":SL(2)=5:FF(2)=200
  :SA(2)=726.6
503 S$(31)="EAL":SL(3)=3:FF(3)=0:SA(
  3)=0
504 S$(41)="SEAG":SL(4)=4:FF(4)=100:
  SA(4)=9200
505 S$(51)="CASH":SL(5)=4:FF(5)=1:SA
  (5)=55
506 S$(61)="FLYT":SL(6)=4:FF(6)=100:
  SA(6)=3020
507 S$(71)="BMKV":SL(7)=4:FF(7)=1000
  :SA(7)=5220
549 Y=7

```


SM TEXT means • Multi-Column Processing • Sophisticated Mathematics
 • Advanced Editing • Total File Overview • Form Mode • Noted Text
 • Ergonomic Design • Ease of Operation and a lot of more features.
 SM TEXT is available for commodore-business computers.

MUCH HAS ALREADY
 BEEN WRITTEN ABOUT
 WORDPROCESSING.
 SOME OF IT WITH

SM-TEXT - SINCE
 PROFESSIONAL WRITERS
 PREFER PROFESSIONAL
 TOOLS.

CREATE YOUR
 LIFE MORE
 SUCCESSFUL!



MCMLXXXIII

SM SOFTWARE INC.
 IS A SUBSIDIARY OF
 SM SOFTWARE AG, MUNICH,
 ONE OF EUROPE'S TOP
 MICRO SOFTWARE HOUSES.

U.S. computer technology, allied
 with German software engineering,
 has also produced high quality
 programming aids such as:

- SM KIT - program de-bug aide
- ESH - ergonomic screen handler
- ISM - index sequential file manager
- LOS - loadable operating system

ASK FOR DETAILS.

Me too in
 future ...



SM SOFTWARE INC.
 262 Bethlehem Pike
 Colmar, PA 18915

SOFTWARE MADE IN MUNICH



Dealer inquiries invited.

```

550 RETURN
601 POSITION 2,17
610 FOR S=1 TO X:PRINT "(2 RIGHT)";:
NEXT S
615 IF HI=0 THEN GOTO 640
620 FOR T=1 TO INT(15/HI):TP(X):PRIN
T T "(UP)";:NEXT T
625 IF S>20 THEN PRINT "(UP)";:GOTO
20040
630 PRINT " ";
635 POSITION 2,1
640 RETURN
650 RESTORE
652 PRINT "YEAR OF PORTFOLIO-YR";:IN
PUT D
654 IF D=0 THEN 210
656 GOSUB 900
658 FOR X=1 TO 1000
660 READ AA$,BB$,CC$,TT$:D=VAL(TT$)
:READ TT$:EE=VAL(TT$):READ TT$:F
F=VAL(TT$):READ TT$:GG=VAL(TT$):
BB=VAL(BB$)
662 IF D=INT(BB/10000) THEN GOSUB 80
0
664 IF AA$="XXXX" THEN GOTO 600
668 NEXT X
670 GOTO 700
675 C=0:GET #1,A:D$=CHR$(A)
676 GOTO 660
680 ? "(4 SPACES)HIT ANY KEY "
681 GET #1,A
685 GOTO 30
700 PRINT "(CLEAR)(3 DOWN)STORING NE
W TRANSACTIONS"
710 PRINT "THERE ARE SEVERAL LINE ST
ATEMENTS THAT MUST BE CHANGED"
725 PRINT "TODAYS DATE-YMMDD":INPUT
DA
728 PRINT "WHICH STOCK":INPUT S0$
730 PRINT "BUY(B) OR SELL(S):INPUT
SS$
735 PRINT "HOW MANY SHARES":INPUT SH
737 PRINT "PRICE PER SHARE ":INPUT
P
741 FOR X=1 TO Y:IF S0$=S*(X*10+1,X*
10+SL(X)) THEN TE=X:X=Y:NEXT X:G
OTO 745
742 NEXT X
745 ? "NET COST OR PROCEEDS";:INPUT
NP
747 IF SS$="B" THEN NW=SA(TE)+NP:NF=
FF(TE)+SH:GOTO 750
748 NW=SA(TE)-NP:NF=FF(TE)-SH
750 PRINT "FF(X) BETWEEN 500-600 IS
";NF
752 PRINT "SA(X) SHOULD BE ";NW
755 PRINT "IT SHOULD BE ABOUT ";TE-1
:" DOWN"
760 PRINT F;" DATA ";S0$;",";DA$;",";
SS$;",";SH$;",";NP$;",";NF$;",";P
768 PRINT "60 F=";F+1
770 PRINT "RUN"
775 PRINT "HIT ANY KEY BUT N TO ENTE
R DATA"
780 GET #1,A
782 IF A=ASC("N") THEN 700
783 END
800 REM ROUNDING
801 DD$=STR$(DD):FF$=STR$(FF):IF LEN
(DD$)=1 THEN DD$(2)=" "
802 L=EE:GOSUB 30000:EE$=JS$:IF LEN(
FF$)=2 THEN FF$(LEN(FF$)+1)=" "
803 IF LEN(DD$)=2 THEN DD$(3)=" "
804 L=GG:GOSUB 30000:GG$=JS$:IF LEN(
FF$)=2 THEN FF$(3)=" "
805 L=INT(FF*GG):GOSUB 30000:HH$=JS$
806 PRINT "STOCK ";AA$:PRINT "DATE
(3 SPACES)";BB$:PRINT "BUY/SELL
";CC$:PRINT "NUM(3 SPACES)";DD$
809 PRINT "%NET(3 SPACES)";EE$:PRINT
"CURR ";FF$:PRINT "MARKET ";GG
$:PRINT "VALUE ";HH$
810 PRINT "HIT ANY KEY TO CONTINUE"
811 GET #1,A
812 PRINT "(CLEAR)"
815 T=T+FF*GG
820 RETURN
850 MP=FF(X)*P(X):R$(X,X)="H":MR=0
855 IF MP>SA(X)*1.1 THEN R$(X,X)="S"
:MP=MP-MP*.1:MR=MP-SA(X)
856 IF MP<SA(X)*.9 THEN R$(X,X)="B"
:MP=MP+MP*.1:MR=SA(X)-MP
858 IF (MR<300) AND (MR>-300) THEN R
$(X,X)="H"
865 RETURN
900 PRINT "{CLEAR}"
901 RETURN
920 ? "WHICH STOCK";:INPUT WH$:V=0:R
ESTORE
925 FOR X=1 TO 1000
930 READ A$,BB$,C$,TT$:D=VAL(TT$):RE
AD TT$:E=VAL(TT$):READ TT$:F=VAL
(TT$):READ TT$:G=VAL(TT$):B=VAL(
BB$)
932 IF B>10000 THEN 940
935 IF WH$=A$ THEN V=V+1:TP(V)=G
936 IF A$="XXXX" THEN GOTO 945
940 NEXT X
945 REM -CREATE GRAPH
946 I=1:HI=0:LP=10
950 FOR X=1 TO V
951 IF HI<TP(X) THEN HI=TP(X)
952 IF LP>TP(X) THEN LP=TP(X)
953 NEXT X
954 PRINT "(CLEAR)(3 DOWN)"
962 FOR X=1 TO 13:PRINT CHR$(1):NEXT
X
964 FOR X=1 TO 30:PRINT CHR$(24);:NE
XT X
970 FOR X=1 TO V
975 GOSUB 601
980 NEXT X
981 POSITION 2,0: ? " HIGH ";HI;"
(6 SPACES)LOW ";LP
982 PRINT "(3 RIGHT)STOCK IS ";WH$
983 PRINT "(15 DOWN)":FOR X=1 TO V:P
RINT TP(X);":NEXT X
985 POSITION 14,22:PRINT "HIT ANY KE
Y"
990 GET #1,A
995 GOTO 30
1000 DATA AGOL,8301,H,0,0,600,5.5
1001 DATA TRVMF,8301,H,0,0,200,4
1002 DATA EAL,8301,H,0,0,6,5
1003 DATA SEAG,8301,H,0,0,100,95
1004 DATA CASH,8301,H,0,0,1,55
1005 DATA FLYT,8301,H,0,0,100,35
1006 DATA SMKV,8301,H,0,0,1000,5.5
1007 DATA AGOL,8302,H,0,0,600,6
1008 DATA TRVMF,8302,H,0,0,200,5
1009 DATA EAL,8302,H,0,0,7
1010 DATA SEAG,8302,H,0,0,100,100
1011 DATA CASH,8302,H,0,0,1,58
1012 DATA FLYT,8302,H,0,0,100,39

```

INSTA

Introducing the **Insta-Series** from Cimarron—**Instant Productivity Software** for the **Commodore 64** Personal Computer. The **Software System:** Insta-Writer, Insta-Mail, Insta-Calc, Insta-Check, Insta-Ledger, Insta-Sched, Insta-File, and proven Word Craft Ultra 64, DTL Compiler 64, and CMAR 64 are all available on **Diskette, Cassette, or Cartridge**. This is a software system specifically designed for **Your Productivity**; manage information—**Instantly!** Call 714 662-2801 or contact the **Commodore Dealer** nearest you. **Insta-Series**—you're communicating with the future—**Now!**



THE INSTA-SERIES IS DISTRIBUTED BY MICRO-SCI MARKETING, DIVISION OF STANDUN CONTROLS, INC., 2158 HATHAWAY STREET, SANTA ANA, CALIFORNIA 92705. TELEX 910-346-6739. FOR A 17" X 22" COLOR POSTER OF "INSTA", SEND \$5 (CHECK OR MONEY ORDER) TO MICRO-SCI MARKETING. CIMARRON, CKE, A DIVISION OF STANDUN CONTROLS, INC., COMMODORE 64 IS A TRADEMARK OF COMMODORE.

```

1010 DATA SMKV,8302,H,0,0,1000,6
1014 DATA AGDL,8303,H,0,0,600,4.5
1015 DATA TRVMF,8303,H,0,0,200,6
1016 DATA EAL,8303,H,0,0,0,4
1017 DATA SEAG,8303,H,0,0,100,85
1018 DATA CASH,8303,H,0,0,1,43
1019 DATA FLYT,8303,H,0,0,100,37
1020 DATA SMKV,8303,H,0,0,1000,7
1021 DATA AGDL,830403,B,100,775,600,
7.5
20000 DATA XXXX,0,X,0,0,0,0,0
20030 REM A SHORT PROGRAM TO CLEAN O
UT LINES OF DATA USING SCREEN
EDITOR
20040 PRINT "(CLEAR) (3 DOWN)"
20050 S=1000
20100 ? "(CLEAR) (3 DOWN)":FOR X=S T
O S+2:PRINT X:NEXT X
20115 PRINT "20050 S=":X:? "POKE842,
12":POSITION 2,0
20370 POKE 842,13
20375 END
30000 L=INT(L*100+5.0E-03)/100:JS%=S
TR$(L)
30010 JL=LEN(JS%):IF JL>2 THEN IF JS
$(JL-2,JL-1)=". " THEN 30040
30020 IF JL>1 THEN IF JS$(JL-1,JL-1)
=". " THEN JS$(LEN(JS%)+1)=". "0":
GOTO 30040
30030 JS$(LEN(JS%)+1)=". "00"
30040 IF JS$(1,1)=". " THEN TT$="":T
T$(2)=JS$:JS%=TT$
30070 RETURN

```

FORTH
programmers:
COMPUTE!
is looking for
screens and
applications
articles.

HERE'S S.A.M.!

PUT HIM IN YOUR DISK DRIVE AND YOUR COMPUTER TALKS.

S.A.M. is the Software Automatic Mouth™ by Don't Ask Software—a complete speech synthesizer on a disk. S.A.M. does what hardware speech devices do, and more—without the high price.

- Natural-sounding speech
- Variable pitch, speed, inflection
- English text-to-speech conversion
- Easy to use in your programs

FOR COMMODORE 64, ATARI, APPLE II+, IIc COMPUTERS

From your software dealer:

Sug. retail prices: C64, Atari versions \$59.95.
Apple version includes d/a card: \$124.95



DON'T ASK™
COMPUTER SOFTWARE INC.

2265 Westwood Bl., Ste. B-150, Dept. C
Los Angeles, CA 90064. (213) 477-4514.

Programmed by Mark Barton. ©1982 Don't Ask, Atari, C64
concepts by Robert Friedman, Mark Lindley respectively. ©1982,
1983 Don't Ask, Commodore 64, Atari, Apple II+, and IIc are trade-
marks of Commodore Business Machines Inc., Atari Inc. and
Apple Computer Inc., respectively.

DYNAMIC PRINTER INTERFACES

for the VIC 20™ and the COMMODORE 64™

UNLIKE ANY OTHERS THAT HAVE COME BEFORE

It's not quick or easy to do things right! After 8 long months of research and development, RAX-Ware, TYMAC CONTROLS CORP. and MICRO WARE B.V. have brought the world better parallel interfaces. Better because they both have the ability to provide TRUE EMULATION of the Commodore® printer. That's right! Graphic Characters, tabbing, Dot Graphics, and the other features. A formidable task that was finally accomplished.

THE CONNECTION™ — The Ultimate Parallel interface for the VIC 20 or Commodore 64. This fully intelligent interface plugs into the disk (serial) socket just like the standard printer. It can easily be assigned any device number and it will provide virtually TOTAL EMULATION of the Commodore® printer. Using the latest technology, this interface will display the full GRAPHIC CHARACTERS or convert them to their equivalent representations in clear text. It supports all of the standard commands (OPEN, PRINT#, and CLOSE), Column tabbing, dot tabbing, graphic repeat, addressable graphics, and the other features of the Commodore® Printer. Software designed to operate with the Commodore® Printer will operate using "THE CONNECTION™". Beside this, a 2K buffer has been provided, a full printer self test, LED Status indicators, Printer Reset switch, skip over perf, margin set and programmable line length. This interface is printer specific to take advantage of the special features of your printer. In the standard mode (non-graphics), it is designed to interface virtually any parallel printer with a standard Centronics configuration and connector. Specify your printer when ordering. Additional ROM's may be purchased for other printer applications... All this for \$119.00

BUFFERED PARALLEL CABLE & DRIVER — A parallel interface for the budget minded. This interface plugs into the USER-port and comes with an extensive manual with driver listings for the VIC 20™ and the Commodore 64™. It can be used with virtually any printer that has a standard Centronics type configuration and connection. Fully buffered for maximum protection of your computer. ONLY \$29.95. Add "CABLE STRAINS" certificate for the VIC 20 (diskette for the 64) and get a full Graphic Emulation Driver. With this package you can print all of the Graphic Characters that your computer has plus EMULATE the Commodore® printer. This product is printer specific to take full advantage of your printer. Available for most graphic matrix printers... \$29.95

**MICRO
WARE**

DISTRIBUTING INC.

1342 B Rt. 23,
Butler, NJ 07405

201-838-9027



**Dealer and Distributor
Inquiries Invited**

NOTE: We solicit hardware and software items for the VIC 20® and C64 64®. Royalties, license fees, or outright purchases can be negotiated. C64 64® and VIC 20® are Registered Trademarks of Commodore Business Machines Inc.





Goodbye Charlie

Norman Overpeck

As you wend your way through the cemetery on a black and tempestuous night, beware of the tombstones. If you run into one, lightning will strike – and it only strikes once. The game includes five difficulty levels. Written for the unexpanded VIC, Atari and 64 versions are also included.

It's a dark, stormy night with howling winds and bolts of lightning. You've got to get home – but first you must cross through the cemetery.

Since you don't believe in ghosts, you won't have to worry about them. But the graveyard is very old and there are lots of tombstones. You have to hurry, but you can't bump into a grave marker – if you do, you'll be struck by lightning and it's goodbye, Charlie.

How To Play

"Goodbye Charlie" was originally written for the

unexpanded VIC. The Atari and 64 versions include instructions within the programs.

In the VIC version, four keys (Q, A, S, Z) are used to control movement. The L key is used to light up the screen when you need to peek at the graveyard.

Success in this game depends on memory and perception. At the start, the computer will randomly place the tombstones and briefly light up the screen so you can see the obstacles. Get a good look. The first look is free, but any after that will cost you points.

You will have to move across a dark screen relying only on your memory of the tombstones' locations. Remember – if you lose your nerve, you can get additional glimpses of the cemetery by pressing L, but this will subtract points from your score.

Goodbye Charlie has five difficulty levels. After typing in and saving the program, try the

Be Amazed!



Telengard: How low can you go?

We've created a subterranean monster. Fifty stories low.

That's the number of levels in the **TELENGARD** dungeon.

Each labyrinthine level holds hundreds of dark chambers and tomb-like corridors for the mighty adventurer to explore. It goes without saying that a shifting collection of hideous monsters with unpredictable behavior patterns can make life in the **TELENGARD** maze quite interesting—and frequently quite short!

Using wits, magic and true grit, your character delves deeper and deeper into the depths of **TELENGARD** in this realtime fantasy role-playing game. Available on cassette for Commodore® 64, Atari® Home Computers (40K), TRS-80® Mods, 1/III (32K) and PET® 2001 (32K) for a ghoulish \$25.00, 48K diskettes for Apple® II, Atari®, Commodore® 64 and TRS-80® available also, for \$28.00.

AND FOR THOSE WHO DON'T DIG UNDERGROUND GAMES... There's **B-1 NUCLEAR BOMBER**, a nail-biting solitaire simulation of a manned B-1 on a mission over the Soviet Union. Your plane is equipped with six Phoenix Missiles, a one megaton warhead and orders to retaliate! Cassette for Commodore 64, Atari Home Computers (32K), TI99/4 & 4A (16K), VIC-20 (16K), Timex/Sinclair 1000 (16K), and TRS-80 Mods, 1/III (16K) are available for an explosive \$16.00. Diskette versions for Apple (48K), TRS-80 (32K), Atari (24K) and IBM (48K) just \$21.00.



NUKEWAR: Defend your country by massive espionage efforts, or by building jet fighter bombers, missiles, submarines and ABMs. Your cold and calculating computer will choose its own strategy! Cassette for Commodore 64, VIC-20 (16K), TRS-80 Mods, 1/III (16K) and Atari Home Computers just \$16.00.

FOOTBALL STRATEGY: Animated action on a scrolling field. A head-to-head challenge or solitaire as you select the best offensive or defensive plays in response to your opponent. Commodore 64, Atari Home Computers (32K) and TRS-80 Models 1/III/IV (16K) cassette for \$16.00, Atari (32K), IBM (64K) and TRS-80 Models 1/III/IV (32K) diskettes available at \$21.00.

T.G.I.F.: Thank Goodness It's Friday! Avalon Hill's new party game for one to four players recreating an often-not-so-typical week in the lives of the working class. Half the fun is just making it from Monday to Sunday. Commodore 64, Atari Home Computers (40K) cassette for a meager \$20.00, Atari diskette (48K) for \$25.00.

AVAILABLE WHEREVER GOOD COMPUTER GAMES ARE SOLD or call Toll-Free: 1 (800) 638-9292 for the name of a store near you. Ask for Operator C.

microcomputer games®

a Division of the

Avalon Hill Game Company

4517 Harford Road, Baltimore, MD 21214 U.S.A. Earth

® Trademarks of Tandy Corp., Apple Computers, Commodore Business Machines, Warner Communications and International Business Machines.

MEET YOUR CHALLENGE



In Miner 2049er,™ you helped the legendary mounty, Bounty Bob,™ track the villainous Yukon Yohan,™ through an abandoned uranium mine — all ten levels of it — grabbing buried treasure and avoiding deadly radioactive mutants along the way.

Well, that was only the beginning!

Yukon Yohan has escaped to the city and Bounty Bob is after him! Only this time, Bob's run out of bucks, so he's taken a job as a fireman to fund the chase. And guess which villain has torched a skyscraper to trap Bojantly Bob?

You guessed it — Yukon Yohan!

Scraper Caper™ has all the action, adventure and excitement that can be packed into a ROM cartridge. And it features a mind boggling number of rounds, difficulty adjustment, high score table, demo mode and spectacular sound and graphic effects.

Miner 2049er is a gamer's gold mine, but you've got to beat Scraper Caper to get to the top! Scraper Caper is available from your local dealer for the ATARI® 5200 Supersystem™ and all ATARI Home Computers.

Suggested Retail \$49.95

BIG FIVE SOFTWARE

14640 Kenwick Ave., Van Nuys, CA 91405 (213) 782-6861

Miner 2049er, "Scraper Caper," "Bounty Bob" and "Yukon Yohan" are trademarks of Big Five Software. "ATARI" and "ATARI 5200 Supersystem" are registered trademarks of Atari, Inc.

**HOTTEST
YET IN...**

**CRAPER
LAPEK**

Programmed
by Bill Hogue



first level so you can acquaint yourself with the game.



You get a brief look at the graveyard before continuing your night stalk in the VIC version of "Goodbye Charlie"

Program 1: Goodbye Charlie - VIC Version

```

5 CL=30720
6 PRINT "{CLR}"
7 PRINTTAB(2){2 DOWN} GOODBYE CHARLIE"
10 FORA=7680TO7701:POKEA,43:POKEA+CL,6:NEXT
   XT
15 FORA=7701TO8185STEP22 :POKEA,43:POKEA+
   CL,6:NEXT
25 FORA=8185TO8164STEP-1:POKEA,43:POKEA+C
   L,6:NEXT
30 FORA=8164TO7680STEP-22:POKEA,43:POKEA+
   CL,6:NEXT
32 FORI=1TO2800:NEXT
35 PRINT "{BLU}{CLR}{2 DOWN}IT IS A DARK,C
   OLD AND":PRINTSPC(4)"RAINY NIGHT
36 PRINT "{DOWN}AND YOU HAVE CHOSEN":PRINT
   SPC(1)"TO CROSS A GRAVEYARD"
37 PRINTSPC(5)"TO REACH HOME"
38 PRINT "{DOWN}{RIGHT}THERE IS A VIOLENT
   {4 SPACES}STORM AND THE GRAVE"
39 PRINTTAB(2)"YARD IS MOMENTARILY
   {3 SPACES}LIT UP ";
40 PRINT "BY LIGHTNING"
42 PRINTTAB(2){DOWN}IF YOU BUMP INTO A
   {2 SPACES}TOMBSTONE YOU WILL BE HIT BY
   THE LIGHTNING"
44 PRINT "{3 DOWN}[3 SPACES]DIRECTIONS? Y/
   N"
45 GETA$:IFA$=""THEN45
46 IFA$="N"THEN89
48 PRINT "{CLR}{2 DOWN}"
50 PRINTTAB(8)"Q=UP{2 DOWN}"
51 PRINTTAB(2)"A=LEFT{5 SPACES}S=RIGHT"
60 PRINTTAB(8){2 DOWN}Z=DOWN"
65 PRINT "{2 DOWN}PRESS L";
70 PRINT "{3 RIGHT}FOR A QUICK":PRINT
72 PRINT "LOOK AT THE GRAVEYARD"
75 PRINT "{3 DOWN}EACH LOOK WILL LOWER
   {9 SPACES}YOUR SCORE
80 PRINT "{2 DOWN}PRESS RETURN TO CONT
85 GETA$:IFA$<>CHR$(13)THEN85
89 PRINT "{CLR}{GRN}"
90 PRINT "{YEL}{CLR}{3 DOWN}LEVEL OF DIFFI
   CULTY":SC=B:C=30720
91 PRINTTAB(6)"[2 DOWN]1 2 3 4 5"
92 GETA$:IFA$<>"1"ANDAS<>"2"ANDAS<>"3"AND
   AS<>"4"ANDAS<>"5"THEN92
93 IFPEEK(197)=0THEN300
94 IFPEEK(197)=56THEN310
95 IFPEEK(197)=1THEN320
96 IFPEEK(197)=57THEN330
97 IFPEEK(197)=2THEN340
98 POKE36879,8:GOSUB200:GOSUB200:PRINT"
   {CLR}":GOTO410
100 PRINT "{CLR}"
105 PRINTTAB(15)"NN"
110 PRINTTAB(13)"NZN"
115 PRINTTAB(12)"NNNN"
120 PRINTTAB(9)"NZN"
125 PRINTTAB(8)"NNNN"
130 PRINTTAB(7)"NN"
135 PRINTTAB(6)"NN"
140 PRINTTAB(6)"Z"
145 PRINTTAB(5)"N"
146 PRINT "{CLR}":RETURN
148 PRINT "{CLR}":PRINTTAB(15)"NN"
150 PRINTTAB(13)"NZN"
152 PRINTTAB(12)"NNNN"
155 PRINTTAB(9)"NZN"
160 PRINTTAB(8)"NNNN"
162 RETURN
165 PRINT "{CLR}":PRINTTAB(15)"NN"
170 PRINTTAB(13)"NZN"
175 PRINTTAB(13)"NNNN"
178 RETURN
180 PRINT "{WHT}"
200 PRINT "{WHT}":FORT=1TO3:GOSUB165:FORR=
   1TO30:NEXTR,T
205 FORT=1TO3:GOSUB140:FORR=1TO30:NEXTR,T
210 FORT=1TO9:GOSUB100:NEXT
222 POKE649,1
225 FORT=1TO9:POKE36879,59:POKE36879,25:P
   OKE36879,8:NEXT
230 POKE36877,220:FORL=15TO0STEP-3:POKE36
   878,L:FORM=1TO275:NEXTH,L
235 POKE36877,0:POKE36878,0:RETURN
300 Z=55:CU=8175:DF=.2:GOTO98
310 Z=80:CU=8179:DF=.25:GOTO98
320 Z=118:CU=8169:DF=.3:GOTO98
330 Z=138:CU=8182:DF=.35:GOTO98
340 Z=160:CU=8165:DF=.4:GOTO98
410 FORK=1TOZ
415 X=INT(RND(1)*440)+7746
420 POKEK,97:POKEK+C,0:NEXT
425 POKECU,15:POKECU+C,1:POKECU-22,32:POK
   ECU+1,32:POKECU-1,32
430 FORT=7680TO7767:POKET,32:NEXT
435 FORT=7680TO7700:POKET,35:POKET+C,1:NE
   XT
440 POKE7690,32
442 GOSUB800:SC=SC+(INT(SC/10))
445 GETA$:IFA$=""THEN445
446 IFPEEK(7690)=15THEN700
447 POKE649,1
450 IFA$="Q"THEN500
455 IFA$="A"THEN520
460 IFA$="S"THEN540
465 IFA$="Z"THEN560
470 IFA$="L"THENGOSUB800
475 GOTO445
500 IFPEEK(CU-22)=97THEN600
505 IFPEEK(CU-22)=35THENCUCU+22
515 POKECU,32:CU=CU-22:POKECU+CL,1:POKECU
   ,15:S=CS+10:GOTO445
520 IFPEEK(CU)=97THEN600

```

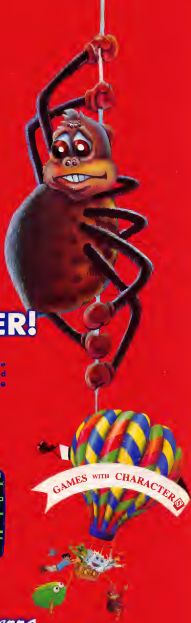
**BUY 2
SIERRAVISION
PRODUCTS
GET 1
FREE**

CLIMB TO NEW HEIGHTS WITH APPLE CIDER SPIDER!

Apple Cider Spider's spent a tough day catching pests in the basement of a cider factory, and all he wants is a good night's rest. Loop through streams of cider and avoid the dice smasher on the first floor. Dodge apples and the slicer on the second floor. Steer clear of falling fruit on the third floor. Finally, crawl into your attic web for a final hurrah! The hazards increase with each level: hungry frogs, birds and wasps. A teddy-bear mode lets little ones in on the action. Let Apple Cider Spider put hours of pesky, playful fun into your life!



SIERRA ON-LINE BUILDING CORP. SEGOLE CA 9364
209 683 6850



APPLE • ATARI • COM 64 • COLECO

```

525 POKECU,32:CU=CU-1:POKECU+CL,1:POKECU,
15:SC=SC+10:GOTO445
540 IFPEEK(CU)=97THEN600
545 POKECU,32:CU=CU+1:POKECU+CL,1:POKECU,
15:SC=SC+10:GOTO445
560 IFPEEK(CU)=97THEN600
565 POKECU,32:CU=CU+22:POKECU+CL,1:POKECU
,15:SC=SC+10:GOTO445
600 PRINT"[CLR][2 DOWN][BLU]"
605 PRINTTAB(7)"[4 DOWN]R.I.P.
610 GOSUB230
615 PRINTTAB(2)"[PUR][8 DOWN]TOO BAD CHAR
LIE!!"
620 FORT=1TO2500:NEXT:PRINT"[2 DOWN]
[2 RIGHT]ANOTHER GAME? Y/N"
625 GETAS:IFAS=" "THEN625
628 IFAS<>"Y"ANDAS<>"N"THEN625
630 IFAS="Y"THEN90
640 PRINT"[CLR]"
645 PRINTTAB(3)"[3 DOWN]GOODBYE CHARLIE"
650 END
700 PRINT"[CLR][2 DOWN]SCORE=";INT(SC*DF)
*10
710 POKE36879,140:PRINT"[7 DOWN][2 RIGHT]
YOU MADE IT HOME
720 PRINT:PRINT"[3 RIGHT]SAFE CHARLIE!
730 FORT=1TO2500:NEXT:PRINT"[4 DOWN]NEW G
AME? Y/N"
735 GETAS:IFAS=" "THEN735
740 IFAS="Y"THEN90
745 GOTO640
800 SC=SC-(INT(SC/10))
805 FORT=1TO4:POKE36879,127:FORD=1TO70:NE
XTD:POKE36879,8:NEXT:GOSUB225:RETURN

```

Program 2: Goodbye Charlie – Atari Version

```

1001 GRAPHICS 0:SETCOLOR 2,0,0:SETCO
LOR 1,0,0:CH=PEEK(742):$256-1024
1002 FOR I=0 TO 55:READ A:POKE CH+I,
A:NEXT I
1003 DATA 0,0,0,0,0,0,0,0
1004 DATA 24,24,126,126,24,24,24,24
1005 DATA 28,34,65,65,65,34,28,0
1006 DATA 34,255,34,255,34,255,34,34
1007 DATA 1,2,4,8,16,32,64,128
1008 DATA 128,64,32,16,8,4,2,1
1009 DATA 252,2,3,12,48,192,64,63
1010 GRAPHICS 17
1020 SC=PEEK(88)+PEEK(89):$256
1022 SETCOLOR 0,0,4:SETCOLOR 2,3,8
1025 POSITION 2,9
1030 PRINT #6;"[PUR][8 DOWN]TOO BAD CHAR
LIE!!"
1050 FOR A=SC TO SC+19:POKE A,11:NEXT
T A
1060 FOR A=SC+19 TO SC+479 STEP 20:P
OKE A,11:NEXT A
1070 FOR A=SC+479 TO SC+460 STEP -1:
POKE A,11:NEXT A
1080 FOR A=SC+460 TO SC STEP -20:POK
E A,11:NEXT A
1090 FOR I=1 TO 1500:IF STRIG(0)=1 T
HEN NEXT I
1091 REM DATA 0,0,0,0,0,0,0,0
1095 POKE 752,1:GRAPHICS 0:SETCOLOR
2,0,0:SETCOLOR 1,0,6
1100 POSITION 2,1:PRINT "It is a dar
k, cold, and rainy night,"
1110 PRINT "and you have chosen to c
ross a":PRINT "graveyard to rea
ch home."
1130 PRINT "(DOWN)There is a violent
storm and the"
1140 PRINT "graveyard is momentarily
lit up"
1150 PRINT "by lightning.":PRINT "
(DOWN)If you bump into a graves
tone"
1160 PRINT "you will be hit by the 1
lightning."
1170 PRINT "(DOWN)Steer with a joyst
ick in port #1."
1175 PRINT "Use the firebutton for a
quick look":PRINT "at the grav
eyard."
1180 PRINT "(DOWN)Each look will low
er your score."
1190 PRINT "(2 DOWN)(5 SPACES)DEGREE
OF DIFFICULTY":SCORE=0:PRINT "
(10 SPACES)1 2 3 4 5":X=0
1210 POSITION 11,X*2,20:PRINT "
(RIGHT)":GOSUB 5000
1212 IF STRIG(0)=0 THEN 1250
1215 A=STICK(0):IF A=15 THEN 1212
1220 IF A=7 THEN X=X+1:IF X>4 THEN X
=0
1230 IF A=11 THEN X=X-1:IF X<0 THEN
X=4
1240 GOTO 1210
1250 ON X+1 GOSUB 1430,1440,1450,146
0,1470:GRAPHICS 17:POKE 756,CH/
256:GOSUB 1200:GOSUB 1200
1255 PRINT #6:"(CLEAR)":SETCOLOR 4,0
,0:SETCOLOR 0,0,0:GOTO 1500
1260 REM DATA 0,0,0,0,0,0,0,0
1280 FOR T=1 TO 3
1290 PRINT #6:"(CLEAR)":POSITION 13,
1:PRINT #6:"$":POSITION 11,2:P
RINT #6:"$%"
1300 POSITION 11,3:PRINT #6:"$%"
1310 FOR R=1 TO 20:NEXT R:NEXT T
1320 FOR T=1 TO 3
1330 PRINT #6:"(CLEAR)":POSITION 13,
1:PRINT #6:"$":POSITION 11,2:P
RINT #6:"$%"
1340 POSITION 7,4:PRINT #6:"$%":PO
SITION 7,5:PRINT #6:"$%"
1360 FOR R=1 TO 20:NEXT R:NEXT T
1370 FOR T=1 TO 9
1380 PRINT #6:"(CLEAR)":POSITION 13,
1:PRINT #6:"$":POSITION 11,2:P
RINT #6:"$%"
1390 PRINT #6:"(7 SPACES)$%":PRINT
#6:"(6 SPACES)$%":PRINT #6:"
(5 SPACES)$%":PRINT #6:"
(4 SPACES)$%":PRINT #6:"
(4 SPACES)5"
1395 PRINT #6:"(3 SPACES)$%":PRINT #6
:"(CLEAR)"
1400 NEXT T
1410 FOR T=1 TO 9:SETCOLOR 4,0,6:SE
TCOLOR 4,0,6:SETCOLOR 4,0,0:NEX
T T
1420 FOR L=15 TO 0 STEP -1:SOUND 0,1
,8,L:FOR J=1 TO 50:NEXT J:NEXT
L:RETURN
1430 Z=55:CU=SC+470:DF=0.2:RETURN
1440 Z=80:CU=SC+474:DF=0.25:RETURN
1450 Z=110:CU=SC+464:DF=0.3:RETURN
1460 Z=130:CU=SC+477:DF=0.35:RETURN

```

WELCOME TO APSHAI. YOU'RE JUST IN TIME FOR LUNCH.



ridge version of the Computer Game of the Year,*
Temple of Apschai."

Gateway has eight levels. And over 400 dark,
nasty chambers to explore. And because it's joy-
stick controlled, you'll have to move faster than ever.

But first you'll have to consider your strategy.

Boy, have you taken
a wrong turn. One moment
you're gathering treasure
and the next you're being
eyed like a side of beef.

You're in the Gateway
to Apschai.* The new cart-

Is it treasure you're after? Or glory? You'll
live longer if you're greedy, but slaying mon-
sters racks up a higher score.

The Apschai series is the standard by
which all other adventure games are judged.
And novices will not survive.

They'll be eaten.

One player; Temple of Apschai, disk/cassette;
Gateway to Apschai, cartridge, joystick control.



EPYX
COMPUTER SOFTWARE

STRATEGY GAMES FOR THE ACTION-GAME PLAYER.



```

1470 Z=160:CU=SC+460:DF=0.4:RETURN
1490 REM GOODBYE CHARLIE
1500 FOR K=1 TO 2
1510 X=SC+INT(RND(1)*400)+60
1520 POKE X,1:NEXT K
1530 POKE CU-20,0:POKE CU+1,0:POKE C
  U-1,0
1540 FOR T=SC TO SC+19:POKE T,131:NE
  XT T:FOR T=SC+20 TO SC+79:POKE
  SC,0:NEXT T:POKE SC+10,0
1550 POKE CU,66:GOSUB 4000:SCORE=SCO
  RE+INT(SCORE/10)
1555 REM GOODBYE CHARLIE
1560 POKE CU,66:GOSUB 5000:IF CU=SC+
  10 THEN 2500
1565 IF STRIG(0)=0 THEN GOSUB 4000
1570 A=STICK(0):IF A=15 THEN 1565
1580 DR=20:IF A=14 THEN DR=-20
1590 IF A=7 THEN DR=1
1600 IF A=11 THEN DR=-1
1610 POKE CU,0:CU=CU+DR:IF PEEK(CU)=
  1 THEN 2000
1620 IF PEEK(CU)=3 THEN CU=CU-DR:GOT
  O 1560
1630 SCORE=SCORE+10:GOTO 1560
1990 REM GOODBYE CHARLIE
2000 POKE 756,224:PRINT #6:“(CLEAR)”
  :SETCOLOR 0,0,6:POSITION 7,7:PR
  INT #6:“R.I.P.”:GOSUB 1420
2010 POSITION 1,16:PRINT #6:“TOO BAD
  , CHARLIE!”
2020 FOR T=1 TO 500:NEXT T:POSITION
  5,10:PRINT #6:“PRESS FIRE”:PRIN
  T #6:“(4 SPACES) TO PLAY AGAIN”:
2030 FOR I=0 TO 1500:IF STRIG(0)=1 T
  HEN NEXT I:PRINT #6:“(CLEAR)”
  (2 DOWN):GOODBYE CHARLIE”:END
  GOTO 1095
2490 REM GOODBYE CHARLIE
2500 POKE 756,224:PRINT #6:“(CLEAR)”
  :SETCOLOR 0,2,6:POSITION 0,2:PR
  INT #6:“(4 SPACES) SCORE = ”:INT
  (SCORE*DF)*10
2510 POSITION 2,10:PRINT #6:“YOU MAD
  E IT HOME”:POSITION 3,12:PRINT
  #6:“SAFE, CHARLIE”:GOTO 2020
3990 REM GOODBYE CHARLIE
4000 SCORE=SCORE-INT(SCORE/10)
4010 FOR T=1 TO 4:SETCOLOR 0,14,6:FO
  R D=1 TO 40:NEXT D:SETCOLOR 0,0
  ,0:NEXT T:GOSUB 1410:RETURN
5000 FOR DD=1 TO 40:NEXT DD:RETURN

```

Program 3: Goodbye Charlie – 64 Version

```

1 POKE 53281,12:POKE53280,13
5 CL=54272
6 PRINT“(CLR)”
7 PRINT TAB(10)“(10 DOWN)[BLK] GOODBYE CH
  ARLIE”
10 FORA=1024TO1063:POKEA,43:POKEA+CL,1:NE
  XT
15 FORA=1063TO2023STEP40 :POKEA,43:POKEA+
  CL,1:NEXT
25 FORA=2023TO1984STEP-1:POKEA,43:POKEA+C
  L,1:NEXT
30 FORA=1984TO1024STEP-40:POKEA,43:POKEA+
  CL,1:NEXT
32 FORI=1TO2000:NEXT
34 POKE 53281,0:POKE53280,0
35 PRINT“(CYN)[CLR][2 DOWN][3 SPACES]IT I

```



64 version of "Goodbye Charlie!"

```

S A DARK,COLD AND RAINY NIGHT.
36 PRINT"[3 SPACES][DOWN]YOU HAVE CHOSEN
  [SPACE]TO CROSS A GRAVEYARD [DOWN]";
37 PRINT"TO REACH HOME, BUT";
38 PRINT"[RIGHT]THERE IS A VIOLENT[DOWN]"
  :PRINT"STORM AND THE GRAVE";
39 PRINTTAB(2)"YARD IS MOMENTARILY[DOWN]
  [3 SPACES]LIT UP ";
40 PRINT"BY LIGHTNING.
42 PRINT"[4 SPACES][DOWN]IF YOU BUMP INTO
  A[2 SPACES]GRAVESTONE YOU[DOWN]
  [2 SPACES]WILL BE HIT BY THE LIGHTNING
  "
44 PRINT"[3 DOWN][53[12 SPACES]DIRECTIO
  NS? Y/N"
45 GETA$:IFAS=" "THEN45
46 IFAS="N"THEN90
48 PRINT"[CLR][2 DOWN]"
50 PRINT"[2 DOWN][53[4 SPACES]STEER WIT
  H JOYSTICK IN PORT 2.
65 PRINT"[3 DOWN][4 SPACES]YOU CAN PRESS
  [SPACE]THE [WHT]FIRE BUTTON[53];
70 PRINT"[RIGHT]FOR[7 SPACES][DOWN]A QUIC
  K";
72 PRINT" LOOK AT THE GRAVEYARD, BUT"
75 PRINT"[DOWN][4 SPACES]EACH LOOK WILL L
  OWER YOUR SCORE.
80 PRINT"[2 DOWN][WHT][6 SPACES]PRESS
  [RVS]RETURN[OFF] TO CONTINUE
85 GETA$:IFAS<>CHR$(13)THEN85
90 PRINT"[WHT][CLR][3 DOWN][0 SPACES]DEGR
  EE OF DIFFICULTY?"SC=0:C=30720
91 PRINTTAB(12)"[2 DOWN][YEL]1 [PUR]2
  5633 5734 [CYN]5"
92 GETA$:IFAS<"1"ORA$="5"THEN92
93 IF AS="1"THENZ=55:CU=2012:DF=.2
94 IF AS="2"THENZ=80:CU=2016:DF=.25
95 IF AS="3"THENZ=110:CU=2006:DF=.3
96 IF AS="4"THENZ=130:CU=2019:DF=.35
97 IF AS="5"THENZ=160:CU=2002:DF=.4
98 GOSUB200:GOSUB5000:GOSUB200:GOSUB5000:
  PRINT"[CLR]":GOTO410
100 PRINT"[CLR]"
105 PRINTTAB(25)"NN"
110 PRINTTAB(23)"NNNN"
115 PRINTTAB(22)"NNNNN"
120 PRINTTAB(19)"NNNNN"
125 PRINTTAB(18)"NNNNN"
130 PRINTTAB(17)"NN"

```

PITSTOP. WHERE WINNING IS THE PITS.



You'll never make Grand Prix champion just driving in circles.

You've got to stop sometime. The question is when. Right now you're in the lead. But the faster

you go, the more gas you consume. And the quicker your tires wear down.

If you do pull into the pits, though, you lose precious seconds. So it's up to you to make sure the pit crew is quick with those tires. And careful with that gas. Otherwise, poof! you're out of the race.

So what'll it be, Mario? Think your tires will hold up for another lap? Or should you play it safe and go get some new ones?

Think it over. Because Pitstop™ is the one and only road race game where winning is more than just driving. It's the pits.

Goggles not included.

One or two players; 6 racecourses, joystick control.



EPYX
COMPUTER SOFTWARE

STRATEGY GAMES FOR THE ACTION-GAME PLAYER.



```

135 PRINTTAB(16)*"NN"
140 PRINTTAB(16)*"2"
145 PRINTTAB(15)*"N"
146 PRINT{CLR}:"RETURN
148 PRINT{CLR}:"PRINTTAB(25)"NN"
150 PRINTTAB(23)*"NZN"
152 PRINTTAB(22)*"NNNN"
155 PRINTTAB(19)*"NZN"
160 PRINTTAB(19)*"NNN"
162 RETURN
165 PRINT{CLR}:"PRINTTAB(25)"NN"
170 PRINTTAB(23)*"NZN"
175 PRINTTAB(23)*"NNN"
178 RETURN
180 PRINT{WHT}"
200 PRINT{WHT}:"FOR=1TO3:GOSUB165:FORR=
1TO30:NEXTR,T
205 FOR=1TO3:GOSUB140:FORR=1TO30:NEXTR,T
210 FOR=1TO9:GOSUB100:NEXT
222 POKE649,1
225 FOR=1TO9:POKE53281,3:POKE 53281,1
227 POKE53281,0:NEXT
230 REM MAKE SOME NOISE
235 REM KILL SOME NOISE
238 RETURN
410 FORK=1TOZ
415 X=INT(RND(1)*880)+1144
420 POKEK,97:POKEK+CL,0:NEXT
425 POKECU,15:POKECU+CL,1:POKECU-40,32:PO
KECU+1,40:POKECU-1,40
430 FOR=1024TO1184:POKET,32:NEXT
435 FOR=1024TO1062:POKET,35:POKET+CL,3:N
EXT
440 POKE1044,32
442 GOSUBB00:SC=SC+(INT(SC/10))
445 IF PEEK(56320)=127 THEN 445
446 IFPEEK(1044)=15 THEN700
447 POKE649,1
450 IF (PEEK(56320)AND1)=0 THEN500
455 IF (PEEK(56320)AND4)=0 THEN520
460 IF (PEEK(56320)AND8)=0 THEN540
465 IF (PEEK(56320)AND2)=0 THEN560
470 IF(PEEK(56320)AND16)=0THENGOSUBB00
475 GOTO445
500 IFPEEK(CU-40)=97THEN600
505 IFPEEK(CU-40)=35THENCUCU+40
515 POKECU,32:CU=CU-40:POKECU+CL,1:POKECU
,15:SC=SC+10:GOTO445
520 IFPEEK(CU-1)=97THEN600
525 POKECU,32:CU=CU-1:POKECU+CL,1:POKECU,
15:SC=SC+10:GOTO445
540 IFPEEK(CU+1)=97THEN600
545 POKECU,32:CU=CU+1:POKECU+CL,1:POKECU,
15:SC=SC+10:GOTO445
560 IFPEEK(CU+40)=97THEN600
565 POKECU,32:CU=CU+40:POKECU+CL,1:POKECU
,15:SC=SC+10:GOTO445
600 PRINT{CLR}[2 DOWN]E13"
605 PRINTTAB(15)"[4 DOWN]R.I.P.
610 GOSUB230
615 PRINTTAB(11)"[PUR][B DOWN]TOO BAD CHA
RLIE!!"
620 FOR=1TO2500:NEXT:PRINT"[2 DOWN]
[11 RIGHT]ANOTHER GAME? Y/N"
625 GETA$:IFA$=""THEN625
628 IFA$<>"Y"ANDAS<>"N"THEN625
630 IFA$="Y"THEN90
640 PRINT{CLR}"
645 PRINTTAB(13)"[3 DOWN]GOODBYE CHARLIE"
650 END
700 PRINT{CLR}[2 DOWN]SCORE=":INT(SC/DF)
*10
710 POKE53281,12:PRINT"[7 DOWN][12 RIGHT]
YOU MADE IT HOME

```

```

720 PRINT:PRINT"[13 IIGHT]SAFE CHARLIE!
730 FOR=1TO2500:NEXT:PRINT"[4 DOWN]
[13 RIGHT]NEW GAME? Y/N"
735 GETA$:IFA$=""THEN735
740 IFA$="Y"THENPOKE53281,0:GOTO90
745 GOTO640
800 SC=SC-(INT(SC/10))
805 FOR=1TO4:POKE53281,7:FORD=1TO70:NEXT
D:POKE53281,0:NEXT:GOSUB225:GOTO 5000
5000 S=13*4096+4*256
5010 FOR=STOS+24:POKET,0:NEXT
5020 POKE S+24,15
5030 POKES+5,16*1+10:POKES+6,16*5 +11
5040 POKES+1,80 :POKES,80
5050 POKES+4,129:FORD=1TO380:NEXT:POKES+4
,128
5060 RETURN

```

COMPUTERIZED GREETING CARDS Special Christmas Card Series

Now you can have your computer send a personal message to everyone on your Christmas list. These beautiful Christmas Cards and Envelopes come continuous with tab feed for standard and home printers.

Box 20 Cards w/Matching Envelopes

Only 9⁹⁵

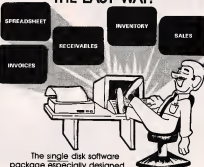
specify design when ordering
 CX 1 - Santa Claus
 CX 2 - Snow Scene and Sleigh
 CX 3 - Yuletide Scene
 CX 4 - Religious

To order send check or money order USA/95C accepted - C.O.D. add \$3.00. Include \$1.50 per order (\$5.00 Foreign Orders) shipping.

COMPCARDS
 P.O. Box 894
 Stone Mountain, GA 30086

Samples sent on request
 Phone orders:
 (404) 299-0713

RUN YOUR BUSINESS THE EASY WAY!



The single disk software package especially designed for ease of use. Now even the beginning computer user need not fear fully automating his business.

The "Business Pack" takes care of everything: right at the point of sale! Invoices, receivables, inventory, sales tax, accounting, everything you need for only \$179.95.

CONTACT
 LOGISTIC ENGINEERING ASSOCIATES
 FOR ALL YOUR 64 SOFTWARE
 [619] 552-1047
 SPECIAL DISCOUNTS FOR DEALERS AND DISTRIBUTORS



NOBODY

DOES IT BETTER



Because we know Adventures best. We're Adventure International, the company that started it all. And whether you prefer your Adventures based on Fact or Fiction, Jyym Pearson's unique story lines will provide unlimited hours of Adventure entertainment.

Choose a journey into the past with **Earthquake — San Francisco 1906**, or a wild ride into the Future in **Escape From Traam**. And for those of you who are intrigued by the supernatural, there's the **Curse of Crowley Manor**.

NEW SAIGON: THE FINAL DAYS

by Jyym & Robyn Pearson

Gritty realism and historic fact blend to form one of the most truly unique Adventuring experiences ever. **SAIGON: THE FINAL DAYS** will plunge you into the chaos and urgency of the last days of America's involvement in Southeast Asia. All of the features you expect are here: two-word command acceptance, extensive computer vocabulary, game save, and more, whisking you into a critical and controversial chapter of recent American history.



JYYM PEARSON'S ADVENTURES WITH GRAPHICS BY NORMAN SAILOR

Brought to you by



159

Apple With GRAPHICS* (48K Disk) \$34.95 each
Atari (32K Disk) \$24.94 each
TRS-80 Model 1, 3, & 4 (32K Disk) \$24.95 each
Atari/CoCo/TRS-80 Model 1, 3, & 4 (16K Tape) \$24.95 each

\$34.95 each
\$24.94 each
\$24.95 each
\$24.95 each

**1-800-
327-7172**

Get Jyym's Adventures from your local dealer today! If they're not in stock, get the Adventures you want by calling us toll-free.

A Subsidiary of Scott Adams, Inc.
PO Box 3435 • Longwood, FL 32750 • (305) 862-6817
Dealer inquiries are always invited!

Crazy Climber

Ted Reynolds

As you scale the side of a building, maneuvering around windows, watch out for the falling flowerpots and attacking birds. Originally written on the VIC with joystick, versions are included for the 64 (with joystick) and the TI-99/4A with Extended BASIC.

"Crazy Climber" is a game requiring manual dexterity and judgment. With a joystick, you control the Crazy Climber as he scales the side of a brick building, avoiding windows and falling objects. The higher he climbs, the higher your score.

The VIC Version

First, type in and save Program 1. Then type in Program 2 and save it immediately following Program 1 on the same tape. When Program 1 is RUN, it will cause Program 2 to be loaded from tape and RUN automatically.

When the game starts, you will see a demonstration of the Crazy Climber in action. After this brief display, he will come to a stop, and you can start play by pressing the fire button.

If the Crazy Climber falls, the game ends and your score is displayed. Simply press the fire button to start another game. The climber will fall if *any* contact is made with a window. It's easy going until your score reaches 100. At this point, you'll have to contend with falling flowerpots. At 300, the flowerpots will stop falling, but you'll have to watch out for birds flying from the left side of the screen. If you reach 600, you've made it to the top of the building, and you start at the bottom of the next building.

The 64 Version

In this version, there are some major differences in play. First, plug the joystick into Port 1. Hit the space bar to start the game. Unlike the VIC version, you can climb onto a window as long as you have some contact with the wall. A variety of objects are tossed down at you - TVs, pianos, barbells, safes (it's one of those wild and crazy apartment buildings) - and they come twice as fast after your score reaches 150.

This version also includes a high score feature. Pressing the space bar will start a new game.

If you'd rather not type in the program, I'll make a copy (VIC version only) if you send a blank tape or disk, SASE, and \$3 to:

Ted Reynolds
145 North Broadway #18
Tooele, UT 84074



DRAGON HAWK™



ANNOUNCING A NEW GAME SO ORIGINAL YOU NEED INSIDE SECRETS JUST TO SURVIVE...MUCH LESS WIN!

Now In Every Dragon Hawk Package: Free Strategy Cards.

Great new game—great new way to play. You are the Dragon Hawk, soaring to attack—and escape from—a host of flying monsters. Each time you press the trigger on your joystick, the hawk's wings flap, lifting you into position to dive, talons extended.

One pounce and another phoenix bird or flying iquana is reduced to a mere floating feather. But if you fail to get above your enemies...zap! You've had it! And you've got to avoid the massive lightning bolts, too.

Finally, on the seventh level, you come

face to face with the dragon himself. But you won't be alone.

To get you there faster and make playing Dragon Hawk more fun than any Commodore 64 game ever, you'll have help at your fingertips. Strategy cards with key tips on crucial parts of the game are included free in your package.

Get your claws on Dragon Hawk right away. It's a thrill so new and different you may never come down.

You'll find Dragon Hawk for the Commodore 64 with disk drive at your local dealer now, or write to UMI direct.



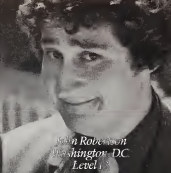
United Microware Industries, Inc.
3503-C Temple Avenue
Pomona, CA 91768 (714) 594-1351



Larry Mark do
Springfield, Virginia
Level 11



Cindy Martin
Portland, Oregon
Level 11



John Robertson
Washington, D.C.
Level 11



Michael Renna
Farmington, Minnesota
Level 10



Scott Tek
St. Paul, Minnesota
Level 10



Daniel Silver
New York, New York
Level 9



Steven L. Carls
Springfield, Massachusetts
Level 11



Jim P.
Raleigh, North Carolina
Level 11



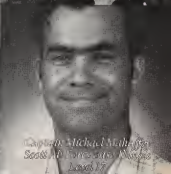
Mary McDermott
Fort Lauderdale, Florida
Level 9



Matt Meador
Whittier, Texas
Level 14



Jean Cole
San Diego, California
Level 15



Captain Michael McHugh
Scott AFB, Texas
Level 17

The 12 Strongest People In The World.



You may know them as students, doctors, office workers, lawyers. But don't let that fool you. They are the *Warriors of Ras*.™

At will, they can enter the world of Ras. A world where sorcery is real and heroics are commonplace. It is there that you'll find the four challenging new computer role-playing games: *Dunzhin*, *Kaii*, *Wylde* and *Ziggurat*.

You can join them, pitting your mind and reflexes against mazes filled with creatures that are more threatening at every turn. Turns that become more treacherous with every step. And with each triumph you become stronger, faster, wiser.

Even better, you can carry your experience from one game in the *Warriors of Ras* series to the next. You may need to. *Dunzhin*, *Kaii*, *Wylde* and *Ziggurat* are increasingly difficult.

So sharpen your sword. You could become the first Level 20 Warrior. The strongest in the world.

And all the while even your best friends may never know what's happened to you.

screenplay™

Box 3558, Chapel Hill NC 27514 800-334-5470



Dunzhin



Kaii



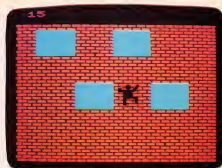
Wylde



Ziggurat

All games are for Atari and Commodore 64.
Dunzhin is also available for Apple and IBM PC.

The ultimate challenge from Screenplay is coming. Play, and you could win \$10,000.



The climber is approaching an open window in the VIC version of "Crazy Climber."

Program 1: VIC Crazy Climber, BASIC Loader

```

90 POKE56,28:POKE52,28:CLR
100 FORA=7168TO7432:READD:POKEA,D:NEXT
110 PRINT"[CLR]{4 SPACES}"CHR$(34)"CRAZYCLIMBER"CHR$(34)
115 POKE631,19:POKE632,131:POKE198,2:NEW
120 DATA0,247,247,247,0,127,127,127,0,119,119,119,0,127,127,127
130 DATA0,247,199,199,0,67,99,97,0,247,227,193,0,65,65,99
140 DATA0,247,227,227,0,71,7,15,0,247,247,247,0,127,113,113
150 DATA0,247,227,193,0,65,65,99,0,247,247,247,0,127,15,15
160 DATA64,170,85,42,60,60,60,24,191,85,170,213,195,195,195,231
170 DATA0,240,244,247,0,127,127,127,0,0,0,0,0,0,0,0
180 DATA0,23,55,247,0,127,127,127,0,240,240,247,0,127,127,127
190 DATA0,0,0,0,0,0,0,0,0,7,7,119,0,127,127,127
200 DATA143,135,195,225,240,0,0,240,255,255,255,255,31,95,15,31
210 DATA0,247,247,247,0,127,127,127,0,0,0,0,23,0,31,31,31
220 DATA0,7,7,199,0,71,71,71,0,224,224,227,0,99,99,99
230 DATA0,0,0,240,0,120,120,120,0,247,247,247,0,127,127,127
240 DATA255,255,255,255,240,250,240,240,241,225,195,135,15,0,15
250 DATA0,247,247,247,0,127,127,127,0,23,23,247,0,127,127,127
260 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
270 DATA0,240,240,247,0,127,127,127,255,255,255,255,255,255,255
280 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0

```

Program 2: VIC Crazy Climber, Main Program

```

1 BN=1:Z=1:GOTO8
2 PRINT"[HOME]{2 DOWN}";BK$:ONZGOTO27,55
3 PRINT"[HOME]{2 DOWN}";W$:ONZGOTO27,55

```

```

4 PRINT"[HOME]{2 DOWN}";W$:ONZGOTO27,55
5 PRINTBK$:GOTO66
6 PRINTW$:GOTO66
7 PRINTW$:GOTO66
8 FORA=828TO987:READD:POKEA,D:NEXTA
9 DATA169,233,133,1,169,31,133,2,169,2,133,0,162,242,160,0
10 DATA177,1,160,22,145,1,198,1,169
11 DATA255,197,1,208,2,198,2,202,208,235,198,0,208,229,96
12 DATA169,233,133,1,169,151,133,2,169,2,133,0,162,242,160,0
13 DATA177,1,160,22,145,1,198,1,169
14 DATA255,197,1,208,2,198,2,202,208,235,198,0,208,229,96
15 P1=37151:P2=37152:LC=7922
16 PRINT"[CLR]":POKE36869,255:POKE36879,8:X=6:POKE36876,220:POKE37154,127
17 SN=36876:VL=36878
18 AS(1)="{RED}BCD[DOWN]{3 LEFT}MKL[DOWN]{2 LEFT}ST[DOWN]{2 LEFT}["AS(2)="{RED}BCG[DOWN]{3 LEFT}JKO[DOWN]{3 LEFT}UV[DOWN]{LEFT}"
19 WS="{RED}@@[CYN]++++[RED]@@@[CYN]++++[RED]@@@@@"
20 BL$="@@@[DOWN]{3 LEFT}@@@[DOWN]{3 LEFT}@@@[DOWN]{3 LEFT}@@@"
21 MP$="{HOME}{11 DOWN}"
22 BK$="{RED}@@@@@@@@@@@@@@@@@@@@@@"
23 W$="{RED}@@@@@@[CYN]++++[RED]@@@[CYN]++++[RED]@@@"
24 DN$="{22 DOWN}"
25 PRINT"[DOWN]";FORA=0TO19:PRINTBK$:NEXT
26 PRINT"[HOME]{2 DOWN}";FORA=0TO3:PRINTW$:NEXT
27 PRINTMP$:TAB(X+M);AS(1+M);FORA=0TO100:NEXT
28 PRINTMP$:TAB(X+M);BL$:SYS828:SYS868:PRINT"[HOME]{RVS}";G
29 POKE36878,5:POKE36878,0
30 IFM=0THENM=1:GOTO32
31 IFM=1THENM=0:GOTO32
32 G=G+1:IFG=50ANDG<58THENPRINT"[HOME]{2 DOWN}{RVS}{WHT}C[RED]R[CYN]A[PUR]Z[GRN]Y[BLU]C[YEL]L[WHT]I[RED]M[CYN]B[PUR]E[GRN]R":GOTO27
33 IFG=58THEN36
34 L=L+1:ONLGO2TO2,2,2,3,3,3,3,2,2,2,2
35 L=0:GOTO34
36 PRINTMP$:TAB(X+M);AS(1+M)
37 FORA=1TO1000:NEXT:Y=7
38 PRINT"[CLR]{DOWN}";FORA=0TO19:PRINTBK$:NEXT
39 PRINT"[HOME]{2 DOWN}";FORA=1TO4:PRINTW$:NEXT
40 PRINT"[HOME]{22 DOWN}";BK$="{HOME}"
41 PRINTMP$:LEFT$(DN$,Y);TAB(X+M);AS(1+M)
42 IF(PEEK(37151)AND32)<0THEN42
43 Z=2:G=0
44 J0=-(PEEK(P1)AND16)=0:J1=-(PEEK(P1)AND8)=0
45 J2=-(PEEK(P1)AND4)=0:J3=-(PEEK(P2)AND128)=0
46 IFG>100ANDG<299THEN67
47 IFG>300ANDG<599THEN72
48 IFG=600THEN77
49 IFPEEK(P1)+PEEK(P2)=373THEN44
50 PRINTMP$:LEFT$(DN$,Y);TAB(X+M);BL$="{HOME}{RVS}";DN$
51 IFJ0THENX=X-1:XL=1:IFX<0THENX=0

```

A close-up, high-contrast photograph of a woman's face in profile, looking towards the right. She has dark hair and is wearing red lipstick. Her mouth is slightly open, and she is holding a postage stamp between her lips. The stamp features a blue computer monitor with a large red 'C' on the screen, a keyboard, and the number '20c' at the bottom. The background is a solid, vibrant blue.

C

A division of Arrays, Inc.

PDF GENERATED BY THE UNIVERSITY OF CHICAGO LIBRARY. FOR MORE INFORMATION, VISIT www.library.uchicago.edu. THIS DOCUMENT IS THE PROPERTY OF THE UNIVERSITY OF CHICAGO LIBRARY. IT IS TO BE KEPT IN THE LIBRARY AND NOT TO BE LOANED OUT. IT IS TO BE KEPT IN THE LIBRARY AND NOT TO BE LOANED OUT. IT IS TO BE KEPT IN THE LIBRARY AND NOT TO BE LOANED OUT.

```

52 IFJ1THENG=G-1:SC=SC-1:YL=-1:Y=Y+1:IFY>
7THENY=7:G=G+1:SC=SC+1
53 IFJ2THENG=G+1:SC=SC+1:YL=1:Y=Y-1:IFY<0
THENY=0:GOTO59
54 IFJ3THENG=X+1:XL=-1:IFX>17THENX=17
55 M=(255-M)AND1:POKE36878,5:POKE36878,0
56 ZX=LC+X+M+(22*Y)
57 IFPEEK(ZX)ORPEEK(ZX+2)ORPEEK(ZX+66)ORP
EEK(ZX+68)THEN63
58 PRINTMP$;LEFT$(DN$,Y);TAB(X+M);A$(1+M)
:GOTO44
59 SYS828:SYS868:IFPT=1THENPP=PP+22:PM=PM
+1
60 IFBD=1THENBP=BP+22
61 L=L+1:ONLGO2,2,2,2,3,3,3,3,2,2,2,2,4
,4,4,4
62 L=0:GOTO61
63 PRINT"[HOME]{22 DOWN}";:POKESN,250:POK
EVL,10:FORA=1TOG
64 L=L+1:ONLGO2,6,6,6,5,5,5,5,7,7,7,7,5
,5,5,5
65 POKESN,PEEK(SN)-1:L=0:GOTO64
66 NEXTA:PRINT"[CLR]":X=6:L=0:POKESN,220:
POKEVL,0:PRINT"[RVS]{WHT} SCORE:"G"
[RE]":SC=SC-G:GOTO37
67 IFPT=1THENPM=PM+1:IFPM=>20THENPT=0:PM=
0:POKEPP,PL
68 IFPT=0THENPP=INT(RND(1)*21)+7724:PT=1:
PL=PEEK(PP)
69 POKEPP,PL:PP=PP+22:PL=PEEK(PP)
70 IFPL<>31ANDPL<>0THENPL=0:PP=7746:GOTO6
3
71 POKEPP,9:GOTO49
72 IFBD=1THENBH=BH+1:IFBH=>19THENBD=0:BH=
0:POKEBP,BL:POKEBP-1,B1
73 IFBD=0THENBP=INT(RND(1)*18)*22+7725:BD
=1:BL=PEEK(BP):B1=PEEK(BP-1)
74 POKEBP,BL:POKEBP-1,B1:BP=BP+1:BL=PEEK(
BP):B1=PEEK(BP-1)
75 IFBL<>31ANDBL<>0THENBL=0:BP=7746:GOTO6
3
76 POKEBP,17:POKEBP-1,16:GOTO49
77 PRINT"[CLR]":POKE36869,240:BN=BN+1
78 PRINT"[3 RIGHT]YOU MADE IT!":PRINT"NO
W FOR BUILDING #";MID$(STR$(BN),2)
79 FORA=1TO2500:NEXT:POKE36869,255:GOTO37

```

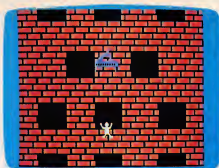
Program 3: Crazy Climber, 64 Version

By Gregg Peele, Assistant Programming Supervisor

```

100 GOTO190
110 S=54272:FOR=STOS+28:POKEE,0:NEXT
120 POKE54296,15:POKE54277,51:POKE5427
8,252
130 POKE 54276,129:POKE 54273,10:POKE
54272,100
140 PORT=1TO 200:NEXT:POKE54276,128:RETUR
N
150 S=54272:FOR=STOS+28:POKEE,0:NEXT
160 POKE54296,15:POKE54277,52:POKE54278
,244
170 POKE 54276,17:POKE54272,2:RETURN
180 FORHG=200TO8STEP-1:POKE54273,HG:NEXT
190 POKE53281,1:POKE646,0:SC=0:HS=0
200 TI$="000000"
210 PRINT"[CLR]"SPC(3)"ENTERING NECESSARY
DATA FOR SPRITES"
220 PRINTSPC(8)"AND MACHINE LANGUAGE"
230 PRINT"[14 DOWN]{2 RIGHT}TAKE A BREAK
[SPACE]FOR ABOUT FOUR MINUTES"
240 POKE2,0:POKE191,48

```



A piano is about to fall on the climber in the 64 version of "Crazy Climber."

```

250 K=43000:L=1824
260 PORT=12288TO13312+4*STEP3:POKET,239:
POKET+1,239:POKET+2,250
270 PRINT"[HOME]";SPC(16)"[7 DOWN]";RIGHT
$(TI$,3):NEXT
280 PORR=1TO24
290 READ DA
300 PORT=DA TO DA+5:POKET,32:POKET+40,32:
POKET+80,32:POKET+120,32
310 NEXT:PRINT"[HOME]";SPC(16)"[7 DOWN]";
RIGHT$(TI$,3):NEXT
320 DATA12332,12344,12358,12698,12712,130
12,13024,13038
330 DATA13332,13344,13358,13698,13712,140
12,14024,14038
340 DATA14332,14344,14358,14698,14712,150
12,15024,15038
350 D1=0:D2=128:GOSUB620:GOSUB950:D1=64:D
2=-128:GOSUB660:GOSUB1460:POKE50688,1
360 PRINT"[CLR]";:SYS49152:POKE53248,160:
SYS49517
370 V=53248:SC=0:POKEV+21,255:POKEV+1,215
380 V=53248:POKEV+39,1:IFPEEK(700)=0THENS
1=13:S2=15:POKE53272,20
390 IFSC>50ANDPEEK(V+1)>99AND((PEEK(56321)
AND15)=14)THENPOKEV+1,(PEEK(V+1)-.3)
400 IF((PEEK(53278)AND1)OR(PEEK(53279)AND
1)=0)THENO1:GOTO560
410 POKE700,0
420 IFSC>150THENPOKE50688,0
430 SYS49152+24
440 IFPEEK(52993)<20THENPOKE2041,220+RND(
0)*4:POKEV+40,(PEEK(2041)-220)+4
450 POKEV+23,(PEEK(V+23)OR2):POKEV+29,(PE
EK(V+29)OR2)
460 TR=ER=ER-RND(0)*320+24:IFPEEK(52993)<
230THENER=TR
470 IF ER>255THENIFER-255<30THENPOKEV+16,
(PEEK(V+16)OR2):POKEV+2,ER-255
480 IF ER<255THENPOKEV+2,ER:POKEV+16,(PE
EK(V+16)AND253)
490 IF(PEEK(56321)AND15)<15THENPOKE2040,
S1:POKE54296,5:POKE54296,0
500 IF((PEEK(53278)AND1)OR(PEEK(53279)AND
1)=0)THENO1:GOTO560
510 POKEV+29,(PEEK(V+29)OR2):POKEV+23,(PE
EK(V+23)OR2)

```



```

520 IF(PEEK(56321)AND15)=15THENPOKE2040,1
530 IFPEEK(700)THENS1=14:S2=11
540 IF{(PEEK(53278)AND1)OR(PEEK(53279)AND
1)=0}THENSQ=1:GOTO560
550 Q=0:GOTO590
560 POKEV+21,PEEK(V+21)AND1
570 GOSUB150:PORT=1:TO100:SYS49469:POKEV+1
,(PEEK(V+1)+1)AND230
580 POKE54273,ABS(T-100):NEXT Q=0:POKE532
78,0:GOSUB110:GOSUB1360
590 POKEV+21,255:SYS49152+24
600 IF(PEEK(56321)AND15)<15THENPOKE2040,
S2:SC=SC+1
610 GOTO380
620 I1=832
630 READ A:IF A=256 THEN 600
640 PRINT"[HOME]";SPC(16)*[7 DOWN]";RIGHT
$(TI$,3)
650 POKE I1,A:I1=I1+1:GOTO 630
660 PORI=0:TO20
670 FORJ=2:TO8STEP-1
680 PRINT"[HOME]";SPC(16)*[7 DOWN]";RIGHT
$(TI$,3)
690 M1=832+D1+I*3+J:M2=832+D2+I*3+(J-3)
700 FORK=7:TO8STEP-1
710 PRINT"[HOME]";SPC(16)*[7 DOWN]";RIGHT
$(TI$,3)
720 B1=2[K:B2=2[(7-K)
730 V=-((PEEK(M1)ANDB1)<0)
740 POKEM2,PEEK(M2)OR(B2*V)
750 NEXTK,J,I:RETURN
760 DATA 0,0,0,0,56,0,0
770 DATA 124,6,0,56,6,0,254
780 DATA 12,0,124,12,0,56,24
790 DATA 7,255,240,15,255,224,24
800 DATA 254,0,96,254,0,192,254
810 DATA 0,0,254,0,0,254,0
820 DATA 0,255,224,1,255,240,3
830 DATA 0,24,6,0,14,12,0
840 DATA 14,120,0,0,120,0,0
850 DATA 122,0,0,0,0,56,0
860 DATA 48,124,6,48,254,6,24
870 DATA 254,12,24,124,12,12,56
880 DATA 24,15,255,240,7,255,224
890 DATA 0,254,0,0,254,0,0
900 DATA 254,0,0,254,0,0,254
910 DATA 0,0,254,0,1,254,0
920 DATA 3,6,0,6,3,0,124
930 DATA 1,224,120,1,224,0,0
940 DATA 0,122,0,0,256
950 I=14592
960 READ A:IF A=256 THEN RETURN
970 PRINT"[HOME]";SPC(16)*[7 DOWN]";RIGHT
$(TI$,3)
980 POKE I,A:I=I+1:GOTO 960
990 DATA 0,0,0,0,6,0,0
1000 DATA 20,0,0,120,0,0,252
1010 DATA 0,3,230,0,15,131,0
1020 DATA 62,1,128,127,255,248,127
1030 DATA 255,252,85,85,92,127,255
1040 DATA 252,68,0,20,68,0,20
1050 DATA 64,0,16,0,0,0,0
1060 DATA 0,0,0,0,0,0,0
1070 DATA 0,0,0,0,0,0,0
1080 DATA 0,255,255,224,191,255,160
1090 DATA 192,0,96,223,255,96,223
1100 DATA 255,96,223,255,108,223,255
1110 DATA 124,223,31,248,222,15,224
1120 DATA 222,15,96,223,31,96,223
1130 DATA 255,96,223,255,96,223,255
1140 DATA 96,223,255,96,223,255,96
1150 DATA 128,0,32,255,255,224,224
1160 DATA 0,224,224,0,224,224,0
1170 DATA 224,255,0,0,0,0,0
1180 DATA 0,0,0,0,0,0,0
1190 DATA 0,0,0,0,0,0,16
1200 DATA 0,0,56,0,28,56,0
1210 DATA 28,255,255,255,255,255,255
1220 DATA 56,0,28,56,0,28,16
1230 DATA 0,0,0,0,0,0,0
1240 DATA 0,0,0,0,0,0,0
1250 DATA 0,0,0,0,0,0,0
1260 DATA 0,0,0,0,0,0,4
1270 DATA 0,32,2,0,64,1,0
1280 DATA 128,0,129,0,0,66,0
1290 DATA 0,36,0,15,255,240,8
1300 DATA 0,0,0,0,255,16,9,255
1310 DATA 144,9,153,144,9,231,144
1320 DATA 9,189,144,9,195,144,8
1330 DATA 255,16,0,16,15,255
1340 DATA 240,3,0,192,3,0,192
1350 DATA 3,0,192,0,159,256
1360 POKEV+21,0
1370 POKE53281,1:PRINTCHR$(147);"[BLK]
[7 DOWN][10 RIGHT]YOU HAVE FALLEN"
1380 PRINT"[9 RIGHT][3 DOWN]YOUR SCORE WA
S ";SC:IF SC>HSTHENHS=SC
1390 PRINT"[9 RIGHT][3 DOWN]HIGH SCORE WA
S ";HS
1400 PRINT"[DOWN][7 RIGHT][4 INST]HOLD FI
RE TO PLAY AGAIN"
1410 PORT=1:TO1000:GETAS:POKE190,0:NEXT
1420 POKE2,0:POKE191,48
1430 IFPEEK(V+3)>30THEN1430
1440 IFPEEK(197)=64ANDPEEK(V+3)>30THEN144
0
1450 POKE50608,1:SYS49152:POKEV+21,255:GO
TO370
1460 I=49152
1470 READ A:IF A=256 THEN RETURN
1480 PRINT"[HOME]";SPC(16)*[7 DOWN]";RIGH
T$(TI$,3)
1490 POKE I,A:I=I+1:GOTO1470
1500 DATA 169,48,133,254,169,0,133
1510 DATA 253,141,252,207,141,253,207
1520 DATA 165,253,141,254,207,165,254
1530 DATA 141,255,207,173,254,207,133
1540 DATA 253,173,255,207,133,254,160
1550 DATA 0,177,253,153,0,4,200
1560 DATA 208,248,230,254,160,0,177
1570 DATA 253,153,0,5,208,208,248
1580 DATA 230,254,160,0,177,253,153
1590 DATA 0,6,208,208,248,230,254
1600 DATA 160,0,177,253,153,0,7
1610 DATA 208,192,232,208,246,173,1
1620 DATA 220,41,15,281,13,208,44
1630 DATA 24,169,40,109,254,207,141
1640 DATA 254,207,169,0,109,255,207
1650 DATA 141,255,207,56,173,254,207
1660 DATA 233,0,133,2,173,255,207
1670 DATA 233,52,5,2,144,10,169
1680 DATA 48,141,255,207,169,0,141
1690 DATA 254,207,173,1,220,41,15
1700 DATA 201,14,208,51,56,173,254
1710 DATA 207,233,40,141,254,207,173
1720 DATA 255,207,233,0,141,255,207
1730 DATA 56,173,254,207,233,0,133
1740 DATA 2,173,255,207,233,48,5
1750 DATA 2,176,17,24,173,254,207
1760 DATA 105,232,141,254,207,173,255
1770 DATA 207,105,3,141,255,207,169

```

THIS PRINTER COST JUST \$119.95*

Introducing the new - Alphacom 40,
high quality dot matrix printer for
IBMpc and Atari home computers

- Print program listings, charts,
graphics, letters - most anything you
create with your computer.
- Full 40-column width.
- Ultra quiet operation.
- Fast -- two lines per second.
- No maintenance -- 90 day limited
warranty.
- Complete with paper and instructions.
- Get the name of the dealer nearest you
by calling, free 800-415-7047
or in California 800-525-4295.

* Intelligent interface cable for
IBMpc or Atari, sells separately.

Alphacom™

```

1780 DATA 216,133,252,169,0,133,251
1790 DATA 169,10,160,0,162,4,145
1800 DATA 251,200,208,251,230,252,202
1810 DATA 208,246,169,0,141,33,208
1820 DATA 173,1,220,41,15,201,7
1830 DATA 208,36,173,16,208,41,1
1840 DATA 240,7,173,0,208,201,60
1850 DATA 176,22,24,173,0,208,105
1860 DATA 16,141,0,208,173,16,208
1870 DATA 105,0,141,16,208,169,1
1880 DATA 141,188,2,173,1,220,41
1890 DATA 15,201,11,208,36,173,16
1900 DATA 208,41,1,208,7,173,0
1910 DATA 208,201,32,144,22,56,173
1920 DATA 0,208,233,16,141,0,208
1930 DATA 173,16,208,233,0,141,16
1940 DATA 208,169,1,141,188,2,96
1950 DATA 76,24,192,24,169,40,109
1960 DATA 254,207,141,254,207,169,0
1970 DATA 109,255,207,141,255,207,56
1980 DATA 173,254,207,233,0,133,2
1990 DATA 173,255,207,233,52,5,2
2000 DATA 144,10,169,48,141,255,207
2010 DATA 169,0,141,254,207,76,24
2020 DATA 192,120,169,122,141,20,3
2030 DATA 169,193,141,21,3,88,96
2040 DATA 165,161,166,161,142,0,207
2050 DATA 165,161,205,0,207,240,5
2060 DATA 169,0,141,1,207,238,1
2070 DATA 207,173,1,207,141,3,208
2080 DATA 173,0,198,208,9,238,1
2090 DATA 207,173,1,207,141,3,208
2100 DATA 76,49,234,256

```

Program 4: Crazy Climber For The TI-99/4A

Extended BASIC Version by Pat Parrish, Programming Supervisor

```

100 DIM D(7),E(7),G(4),C*(4)
110 GOTO 140
120 REM RANDOMLY PICK WINDOW & PRINT SINISTER MAN
130 V=INT(RND*8):: CALL DELSPRITE(
1) :: CALL SPRITE(4,96,2,D(V)*8
+1,E(V)*8+1):: R=-1 :: Q=-1 ::
RETURN
140 HS=0 :: RANDOMIZE
150 GOSUB 400
160 GOSUB 790
170 GOSUB 670
180 T=0 :: U=-1 :: Q=0 :: R=0 :: SC
=0 :: B=112 :: Z=-3 :: ROW=13 ::
COL=15
190 CALL SPRITE(2,B,2,ROW*8+1,COL*
8+1)
200 IF R THEN CALL SPRITE(1,G(INT(
RND*5)),INT(RND*14)+3,(D(V)+4)*
8+1,E(V)*8+1,15,0):: SC=SC+10 ::
R=0 :: CALL DELSPRITE(4)
210 IF (RND<U)*(R=0)*(Q=0) THEN GOSU
B 130
220 CALL KEY(0,K,ST)
230 IF K=69 THEN ROW=ROW-1 :: IF (R
OW=-1) THEN ROW=23 :: SC=SC+100 ::
U=U+SGN(1-U)/20 :: GOTO 200
ELSE 200
240 IF K=83 THEN COL=COL-SGN(COL-2)
*2 :: GOTO 200
250 IF K=68 THEN COL=COL+SGN(26-COL
)*2 :: GOTO 200
260 IF K=88 THEN ROW=ROW+1 :: IF (R

```

TI-99/4A Version Notes

Pat Parrish, Programming Supervisor

In the TI-99/4A version of this game (written in Extended BASIC), you are the Crazy Climber, scrambling up the face of a building while avoiding numerous objects (piano, iron, broom, safe, barbells) tossed from the windows above. These objects are actually *hurled* down upon you by a relentless, sinister fellow who appears just briefly before throwing each object. If you are quick, you can dodge these oncoming objects. No one knows why he throws things; it's a quirk. Be ready to meet the challenge. For as the game progresses, the villain strikes with greater frequency.

In this game, you move the Crazy Climber over a stationary building with the E, S, D, and X keys. The screen will wrap around when you reach the top or bottom. A hundred points are awarded for crossing the top of the screen, while an equal number are deducted for crossing the bottom. In addition, ten points are given for each falling object that you avoid.

The game ends when you are hit by a falling object or are pushed from a window by the villain. Thus, you are allowed to climb over windows in this version, but you're taking a chance. If the villain emerges while you are in a window, it's curtains for you. (You'll be relieved to discover that the Crazy Climber carries a parachute.)

One line in this program requires that you have a TI Speech Synthesizer connected to your TI-99/4A. If you don't have this peripheral, remove the CALL SAY("UHOH") statement in line 320.

```

OW=24) THEN ROW=0 :: SC=SC-100 ::
: GOTO 200 ELSE 200
270 GOTO 290
280 B=228-B :: Z=197-Z :: CALL SPRI
TE(2,B,2,ROW*8+1,COL*8+1):: CA
LL SOUND(10,Z,2)
290 CALL COINC(ALL,C1):: IF C1 THEN
320
300 CALL POSITION(1,XROW,XCOL):: I
F XROW<100 THEN 200
310 CALL DELSPRITE(1):: Q=0 :: GOT
O 200
320 T=1 :: V=2 :: CALL DELSPRITE(1)
:: CALL SAY("UHOH") :: REM REMO
VE "CALL SAY" IF W/OUT SPEECH S
YNTHESIZER
330 IF TP THEN T=40
340 CALL SPRITE(2,108,2,ROW*8+1,COL
*8+1,25,0):: FOR I=1 TO 95 ::
NEXT I :: CALL MOTION(2,10,0)

```

AARDVARK *Action Software*

PRESENTS...



ZEUS

WITHOUT QUESTION, ABSOLUTELY —

The Fastest
ARCADE STYLE GAME
AVAILABLE THAT WE KNOW OF.

FAST AND FURIOUS. You become the wizard fighting off the thunderbolts of an angry Zeus. Multiple action. Are you good enough to keep up as the difficulty increases wave after wave. Hours of challenging fun. This is one game you may never completely master.

AVAILABLE ON: TRS-80C(16K), CMD 64, VIC 20(13K)
STOCK #1007 TAPE:\$24.95 DISK: \$29.95



PYRAMID... Our toughest and most intriguing adventure. Average time through the pyramid is 50-70 hours. Clue everywhere and some very ingenious problems. This one is out there around the world.

AVAILABLE ON: TRS-80C (16K) CMD 64
VIC 20 (13K) TIMEX/SINCLAIR TI99/4A
STOCK #5002 TAPE: \$16.95 DISK \$24.95



DUNGEONS OF DEATH... A serious G & D game (G for gross up to 6 players at a time). You get a choice of race and character, or screen mapping of the maze, a chance to grow from game to game, and a 16 page manual. Requires extended basic on TRS-80C.

AVAILABLE ON: TRS-80C(16K), CMD 64, VIC 20(13K),
TRS-80C 32K DISK

STOCK #7061 TAPE: \$16.95 DISK: \$24.95

QUEST... A different kind of adventure. Played on a computer generated map of Alera. You lead a small band of explorers on a mission to conquer the Citadel of Moorlock. Takes 2-5 hours to play and is completely different each time.

AVAILABLE ON: TRS-80C(16K) CMD 64
VIC 20(13K) TIMEX/SINCLAIR TI99/4A,
EXTENDED BASIC REQUIRED ON TI
STOCK #7067 TAPE: \$16.95 DISK: \$24.95

Quest is also available on TRS-80C as a 32K extra memory, extra fun adventure. It's a little more difficult, and will test the most experienced explorer of the kingdom.

STOCK #7006 TAPE: \$24.95 DISK: \$29.95



AARDVARK *Action Software*

IS AVAILABLE AT SOFTWARE RETAILERS EVERYWHERE IF YOUR LOCAL COMPUTER OR SOFTWARE STORE DOES NOT CARRY IT — ASK THEM WHY NOT! SEND ONE DOLLAR FOR ILLUSTRATED CATALOG. DEALER INQUIRES INVITED

HOURS OF FUN AND ENJOYMENT FROM THE "ADVENTURE PLACE"

TO ORDER: SEND AMOUNT INDICATED PLUS \$2.00 SHIPPING, PER ORDER. INCLUDE STOCK NUMBER, QUANTITY DESIRED AND YOUR PREFERENCE OF TAPE OR DISK. BE SURE TO INDICATE TYPE OF SYSTEM, AMOUNT OF MEMORY, ETC. WHEN USING CHARGE CARD TO ORDER BY MAIL, BE SURE TO INCLUDE EXPIRATION DATE.



CHARGE CARDS
WELCOME

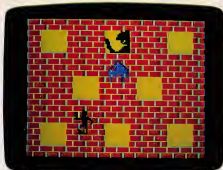


1-800-624-4327

PHONE ORDERS ACCEPTED
8:00 A.M. TO 8:00 P.M. E.S.T. MON-FRI

AARDVARK *Action Software*

2352 S. COMMERCE RD. WALLED LAKE, MI 48098 313/669-3110



TI version of "Crazy Climber."

```

350 CALL SOUND(-50,-7,2):: CALL SPR
ITE(#3,104,16,(ROW+2)*8+1,COL*8
+1,10,0)
360 CALL SOUND(80,5000-T*40,V):: T=
T+1 :: IF T<65 THEN 360
370 CALL POSITION(#1,DR,DC,#3,CR,CC
):: IF DR>192 THEN CALL DELSPRI
TE(#1)
380 IF CR>165 THEN CALL DELSPRITE(#
2,#3):: GOTO 400
390 GOTO 360
400 IF TP THEN GOTO 910
410 CALL DELSPRITE(ALL):: FOR L=1 T
O 100 :: NEXT L :: CALL CLEAR :
: CALL SCREEN(14)
420 DISPLAY AT(10,5):"YOUR SCORE :
":SC
430 IF SC>HS THEN HS=SC
440 DISPLAY AT(13,5):"HIGH SCORE :
":HS
450 DISPLAY AT(16,5):"PLAY AGAIN ?
" :: ACCEPT AT(16,19)8EEP VALID
ATE("YN")SIZE(1):ANS#
460 IF ANS#="Y" THEN 170
470 STOP
480 REM DEFINE CUSTOM CHAR
490 FOR I=120 TO 121
500 READ A#
510 CALL CHAR(I,A#)
520 NEXT I
530 DATA FFB0808080808080,FF010101
1010101
540 CALL MAGNIFY(4):: CALL CHAR(100
,"")
550 CALL CHAR(112,"03232321273F0303
030306081000040980808000C0E0908
8708080808080808080")
560 CALL CHAR(116,"0101010003070911
0901010101010101C0C4C484E4FCC0C
0C0C0601008102070")
570 FOR I=0 TO 4 :: READ C%(I):: G(
I)=124+4*I :: CALL CHAR(G(I),C%
(I)):: NEXT I
580 DATA 2070FF70200000000000000000
0000000040EFF0E04000000000000000
00000000
590 DATA 000000003F3F3F3F3F3F3F3F3F

```

```

3F30300000000000F8F8F9DAFCF8F8F8F
8F81818
600 DATA 0000010103050911273F3F1212
1010100000C0E0F0F8FCFEFEFAF2121
2101010
610 DATA 0300000F0F0F1F000000000000
000000E02020E0F0F0F00000000000
00000000
620 DATA 000000000000000001031E3C7C
FCF8700103060C183060C08000000000
00000000
630 CALL CHAR(104,"01070F1F1F151000
000404020201010000E0F0F0F850001
01020204040000000")
640 CALL CHAR(100,"0204050701010101
02020206000000000004040C08080808
04040406000000000")
650 CALL CHAR(96,"000000000001C1C0E
0E0607070381C1F273F7FFFFFFFFFF37
2F1F030F1F3F7FFF")
660 RETURN
670 CALL COLOR(12,1,1):: CALL COLOR
(9,1,1):: REM SET UP WALL
680 CALL CLEAR :: CALL SCREEN(2)::
ROW#="xyxyxyxyxyxyxyxyxyxyxyxy
xyxy"
690 ROW2#="xyxyxyxyxyxyxyxyxyxyxyxy
xyxy"
700 FOR ROW=1 TO 23 STEP 2 :: DISPL
AY AT(ROW,1):ROW# :: NEXT ROW
710 FOR ROW=2 TO 24 STEP 2 :: DISPL
AY AT(ROW,1):ROW2# :: NEXT ROW
720 FOR ROW=3 TO 6 :: FOR COL=5 TO
25 STEP 10 :: CALL HCHAR(ROW,COL
,100,4) :: NEXT COL :: NEXT ROW
730 FOR ROW=19 TO 22 :: FOR COL=5 T
O 25 STEP 10 :: CALL HCHAR(ROW,
COL,100,4) :: NEXT COL :: NEXT R
OW
740 FOR ROW=11 TO 14 :: FOR COL=10
TO 20 STEP 10 :: CALL HCHAR(ROW
,COL,100,4) :: NEXT COL :: NEXT
ROW
750 CALL COLOR(12,15,7):: CALL COLO
R(9,1,11)
760 E(0)=4 :: E(1)=14 :: E(2)=24 ::
E(3)=9 :: E(4)=19 :: E(5)=4 ::
E(6)=14 :: E(7)=24
770 D(0)=2 :: D(1)=2 :: D(2)=2 :: D
(3)=10 :: D(4)=10 :: D(5)=18 ::
D(6)=18 :: D(7)=18
780 RETURN
790 REM TITLE PAGE
800 CALL CLEAR :: CALL SCREEN(15)
810 ROW#="xyxyxyxyxyxy" :: ROW2#="xyx
yxyxyxy"
820 CALL COLOR(12,15,15)
830 FOR ROW=7 TO 23 STEP 2 :: DISPL
AY AT(ROW,2):ROW# :: NEXT ROW
840 FOR ROW=8 TO 24 STEP 2 :: DISPL
AY AT(ROW,2):ROW2# :: NEXT ROW
850 CALL COLOR(12,15,7)
860 DISPLAY AT(6,19):"T H E" :: DIS
PLAY AT(8,17):"C R A Z Y" :: DI
SPRAY AT(10,15):"C L I M B E R"
870 FOR I=1 TO 100 :: NEXT I :: B=1
16 :: Z=200 :: ROW=19 :: COL=6
880 CALL SPRITE(#2,8,2,ROW#+1,COL#
8+1):: CALL SOUND(10,7,2)

```

```

890 B=228-B :: Z=197-Z :: ROW=ROW-1
:: FOR I=1 TO 50 :: NEXT I ::
IF ROW>1 THEN 880
900 TP=-1 :: GOTO 320
910 TP=0 :: DISPLAY AT(16,13):"USE
E,S,X,D KEYS" :: DISPLAY AT(17,
13):"TO AVOID FALLING"
920 DISPLAY AT(18,13):"OBJECTS." ::
DISPLAY AT(20,16):"GOOD LUCK!"
930 FOR I=1 TO 1000 :: NEXT I :: CA
LL DELSPRITE(102) :: RETURN
940 END

```

COMMODORE 64 SOFTWARE

THE MAILER: A list and label program ideal for mailing lists. Disk. **\$30.00**

SUPER MAILER: A deluxe version. Adds sorts, searches, alphabetizing and more. Disk. **\$50.00**

DATA-BYTES: A data-storage and retrieval program. Prints hard copies. Integrates with the mailer. Disk. **\$30.00**

THE EDITOR: Integrates with mailer and data bytes programs. Add sorts, enhanced editing features and more. Disk. **\$30.00**

SALES 64: Generates personalized sales orders, receipts, invoices & packing slips on economical plain paper. Tractor feed compatible. Disk. **\$30.00**

TRS80 Model 100 version \$30.00 (Apple) Deluxe version \$50.00 (Apple)

SUSIE SOFTWARE

709 Wilshire Drive, Mt. Prospect, IL 60056 (312) 394-5165

STOP PLAYING GAMES

NEW Commodore 64
Apple Disk



- CASCADING ODDS ON HORSE RACES with ANY COMPUTER using BASIC.
- SCIENTIFICALLY DERIVED SYSTEM really works. The Steyer WALKER of Louisville Kentucky used this system to predict the odds of the 1980 Kentucky Derby. See the Wall Street Journal (June 6, 1980) article on Horse Handicapping. This system was written and used by computer experts and is now being made available to home computer owners. This method is based on standing data from a large number of races on a high speed, large scale computer. 23 factors taken from the Daily Racing Form were then analyzed by the computer to see how they influenced race results. From these 23 factors, 161 were found to be the most valid in determining winners. NUMERICAL PROBABILITIES of each of these 161 factors were then computed and this forms the basis of this REVOLUTIONARY NEW PROGRAM.
- SIMPLE TO USE: Obtain Daily Racing Form the day before the races and answer the 10 questions about each horse. Run the program and your computer will print out the odds for all horses in each race. COMPUTER POWER gives you the advantage!
- YOU GET: 1) Casette 2) Listing of BASIC program for use with any computer 3) Instructions on how to get the needed data from the Daily Racing Form 4) List of using the odds generated by the program 5) Sample form to simplify entering data for each race

MAIL COUPON OR CALL TODAY

3G COMPANY, INC. DEPT. CO (503) 357-5607
RT. 3, BOX 28A, GASTON, OR 97119
 Yes, I want to use my computer for FUN and PROFIT! Please send me _____ programs at \$24.95 each. Circle the cassette you need: PET/IBM VIC-20 Commodore 64
 Sinclair II/III 1080 Atari TRS-80 Color Computer or
 Apple II/Apple Disk II/III - add \$5.00
 Enclosed is ☐ check or money order ☐ MasterCard ☐ Visa

Name _____ Exp. date _____
 Address _____
 City _____ State _____ Zip _____

START USING YOUR COMPUTER FOR FUN and PROFIT!

64 PAINTPIC™ 64



"There's nothing like it!"

MODES: pen, brush, text. **CURVED SHAPES:** arc, circle, ellipse. **STRAIGHT SHAPES:** box, line, triangle, parallelogram, fill, pen- or brush-filled shapes. **SETTABLE COLORS:** pen, brushes, brushmoves, four dot-colors, crosshair, border. **MOVES:** horizontal, vertical, diagonal, by dot, brush width, character. **POINT MOVES:** to start, end, midpoint, text home, perspective. **BLOCK MOVES:** copy, rotate 90°, higher/double across and down, mirror across and down. **SELECT FEATURES:** file save/get picture or block to tape/disk, mix shapes, text, all graphics characters, eight storable brushes, select brush width, filled shapes, perspective point and line, mark start, end, perspective point, Help Menus.

Each cassette program has manual with complete instructions. Postage and handling add \$2.00 for US or Canada, \$4.00 foreign. Payment in advance in US Dollars by check or international money order or via visa, MC, American Express.

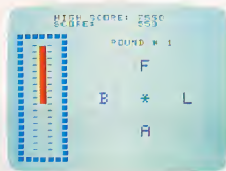
- **EDUCATIONAL ART:** Art the modern way. For ages 12 and up
- **FUN:** You design it, PAINTPIC does the work
- **PROFITABLE TOOL:** PUT PAINTPIC PICTURES IN YOUR OWN PROGRAMS & GAMES
- **SOPHISTICATED:** Fourth generation application for the Commodore 64
- **REVOLUTIONARY:** THE END OF CRUDE GRAPHICS FOR THE 64

Step by step instructions, a good first program.

ph: 714-261-1624
KIWISOFT™ \$35
 Kiwest Programs, 2944 Alpine Way, Laguna Beach, CA 92651

ALPHA BLAST

Dave Miller



Color Computer version of "Alpha Blast."

A test of judgment, speed, and accuracy, this game is a good educational tool for children and fun for adults. Originally written for the Atari, versions are also included for the VIC, TI-99/4A (with Extended BASIC), and Color Computer. Joystick required (optional for TI version).

for the gun you use to shoot the characters. Memory location 20 is the timer. You may safely remove lines which contain only REMarks (no GOTOs will reference them).

A challenge: See if you can get past round 25.

Program 1: Alpha Blast - Atari

This game is fun to play and will also sharpen your alphabetizing skills. How many times do you find yourself saying, "Q, R, S, T, U - yes, T comes before U"? I know I've often said it.

The object of "Alpha Blast" is to shoot the four letters displayed on the screen in alphabetical order. Sounds simple enough, but it isn't. And to make it more difficult, you're being timed. For each correct answer you are awarded points based on the internal character set value. Since I am using lowercase letter values, an A would give you 97 points, G would give you 103 points, and so on. If you fail to shoot a letter in the correct order, the value of that letter will be subtracted from your score. If you get all four letters right, you will advance to the next round with new letters to shoot and less time in which to do it. If time runs out before you complete a round, the game ends, giving you a final score and the high score.

This program uses a redefined character set

```

100 GOSUB 630:REM TITLE ROUTINE
110 GOSUB 690:REM REDEFINE CHSET
120 DIM N(4):HIGH=0
130 ROUND=0:SCORE=0:TIME=50
140 GRAPHICS 10:POKE 750,CHSET/256:IS
ETCOLOR 2,6,5:SETCOLOR 0,0,10:SE
TCOLOR 1,9,6:LASTNUM=0
141 POSITION 15,6:?" #6:SCORE
145 REM **** USE INVERSE CONTROL 'F'
IN 1ST PRINT
150 FOR T=1 TO 10:POSITION 2,T:?" #6:
"([":POSITION 1,T:?" #6:"_":NEXT
T
165 REM **** USE INVERSE '*' FOR PRI
NT
170 POSITION 10,6:?" #6:"[":SCRN=PEEK
(88)+256*PEEK(89):ROUND=ROUND+1:
POSITION 7,0:?" #6:"ROUND ":ROUND
180 TIME=TIME-2:REM SET INCREMENT FO
R TIMER
185 REM **** RANDOM LETTER GENERATOR
190 N(1)=INT(RND(0)*26)+97:POKE SCR
N+46,N(1)
200 N(2)=INT(RND(0)*26)+97:POKE SCR
N+54,N(2):IF N(2)=N(1) THEN 200
210 N(3)=INT(RND(0)*26)+97:POKE SCR
N
```


FIRST, THE GOOD NEWS.



First Star Has 4 New Games.

Fernando Herrera, designer of *ASTRO CHASE™* and our design team again define "State of the Art." Superior graphics, real-time animations,™ multiple

screens, intermissions, arcade-quality sound, innovative gaming, challenge and excitement—we deliver it all!

THE BAD NEWS? You can't play them all at once.



BOING!™

Designed by Alex Leavvas
© Stanley A. Russell
Atari VCS 4900



BRISTLES™

Designed by Fernando Herrera
Atari Home Computers
Commodore Computers



FLIP and FLOP™

Designed by Jim Mangano
Atari Home Computers
Commodore Computers



PANIC BUTTON™

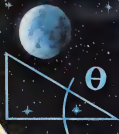
DESIGNED BY Paul Kacemsky
Atari Home Computers
Commodore Computers



Atari, the AT and VCS-4000 are the registered trademarks of Atari, Inc. All other trademarks mentioned herein are the property of their respective owners. All other trademarks mentioned herein are the property of their respective owners. All other trademarks mentioned herein are the property of their respective owners.



"When being first counts...we're number one!"
88 East 41st Street, New York, NY 10017
Distributor and Dealer Inquiries Invited/800-333-4666



$$\sqrt{892}$$

$$a^2 = b^2 + c^2$$



Language
Algebra



Peachtree Software®
by **EDUWARE®**

The Science Of Learning.™ The smartest way to build specific skills.

Discover how your computer
thinks with The Science of Learning.

Computer Literacy

Put the ABCs of computer programming right at your fingertips. The Hands On BASIC Programming™ Book is written in English and requires only a basic knowledge of mathematics. It takes you through the entire programming technique.

You'll learn to develop new computer skills and you'll be backed up with the tools to learn from your experience.

Language Skills

The basics of spelling, reading and computer operation become fun and easy for young children. It captures their attention and entertains as it teaches.

Parents and teachers have a wide variety of teaching options from which to choose according to an individual child's needs. A learner's recorded progress can be periodically reviewed and systematically approached with new programs.

Elementary Mathematics

This program is where a strong foundation in basic mathematics begins. Correct responses advance a learner, while repeated errors bring review. This simple, step-by-step process with an animated figure takes the viewer through each stage of the learning process.

Advanced Mathematics

Mastery of algebra prepares you for success in a competitive world by sharpening your ability to think analytically, apply logic and identify solutions.

Business people who know the connection between sharp analytical skills and advancement use the program to brush up on their knowledge and understanding of algebra.

Parents and teachers enrich a child's schooling by allowing gifted learners to advance at their own pace.

Hands On BASIC Programming, Language Skills programs, Compu-Math™, EduWare® Fractions, EduWare® Decimals and Advanced Mathematics programs are available on Apple II, II+, IIe and Franklin Ace. Compu-Math™ Fractions and Compu-Math™ Decimals are available on Atari 400 and 800. Introduction to Counting™ is available on Apple II, II+, IIe, Franklin Ace and Atari 400 and 800.

The Science of Learning is a division of EduWare. EduWare is a registered trademark of EduWare Services, Inc., an MSA company. Peachtree Software is a registered trademark of Peachtree Software, Incorporated, an MSA company. Hands On BASIC Programming, Compu-Math and Introduction to Counting are trademarks of EduWare Services, Inc. Atari is a trademark of Atari, Inc. Apple is a trademark of Apple Computer, Inc.



The smartest way to learn.™

I am interested in the Peachtree Learning Center™.
Please send me more information about the Learning Center program. I am: ☐ a prospective dealer ☐ an end user.

Name

Company Telephone

Address

City State Zip

Peachtree Learning Center is a trademark of Peachtree Software, Incorporated, an MSA company.
© 1983 Peachtree Software, Incorporated, an MSA company.
2443 Peachtree Road, N.E. / 5th Floor / Atlanta, Georgia 30326 / 1-800-354-8900

MSA
Personal Computer Products
MANAGEMENT SCIENCE AMERICA, INC.

```

+206,N(3):IF N(3)=N(2) OR N(3)=N
(1) THEN 210
220 N(4)=INT(RND(0)*26)+97:POKE SCRN
+214,N(4):IF N(4)=N(3) OR N(4)=N
(2) OR N(4)=N(1) THEN 220
225 REM *** SHOOTING LOOP FOLLOWS
226 REM *** ! * * % ARE ALL INVERS
E
230 ST=STICK(0)
240 IF T=1 THEN GOTO 800
250 IF ST=10 THEN POSITION 10,6: ? #6
: "M":LOCATE 6,2,NUM:GOTO 320
260 IF ST=9 THEN POSITION 10,6: ? #6:
"R":LOCATE 6,10,NUM:GOTO 390
270 IF ST=6 THEN POSITION 10,6: ? #6:
"Z":LOCATE 14,2,NUM:GOTO 460
280 IF ST=5 THEN POSITION 10,6: ? #6:
"U":LOCATE 14,10,NUM:GOTO 530
290 IF N(1)=32 AND N(2)=32 AND N(3)=
32 AND N(4)=32 THEN 140:REM NEXT
ROUND IF ALL LETTERS GONE
295 REM *** CLOCK ROUTINE FOLLOWS
300 IF C+TIME<PEEK(20) THEN C=PEEK(2
0):POSITION 2,T-1: ? #6: " ":POKE
53279,1:T=T-1:IF C>200 THEN POKE
20,0:C=0
310 GOTO 230
315 REM *** BULLET ROUTINES FOLLOW
320 IF NUM=32 THEN GOTO 230
325 Y=5:N(1)=32
330 FOR OIR=9 TO 5 STEP -1:POSITION
OIR,Y: ? #6: " ":FOR W=1 TO 5:NEXT
W:POSITION OIR,Y: ? #6: " ":Y=Y-1
340 SOUND 0,OIR*10,10,OIR
350 NEXT OIR
370 SOUND 0,0,0,0
380 GOTO 590
390 IF NUM=32 THEN GOTO 230
395 Y=7:N(2)=32
400 FOR OIR=9 TO 5 STEP -1:POSITION
OIR,Y: ? #6: " ":FOR W=1 TO 5:NEXT
W:POSITION OIR,Y: ? #6: " ":Y=Y+1
410 SOUND 0,OIR*10,10,OIR
420 NEXT OIR
440 SOUND 0,0,0,0
450 GOTO 590
460 IF NUM=32 THEN GOTO 230
465 Y=5:N(3)=32
470 FOR OIR=11 TO 15:POSITION OIR,Y:
? #6: " ":FOR W=1 TO 5:NEXT W:POS
ITION OIR,Y: ? #6: " ":Y=Y-1
480 SOUND 0,OIR*10,10,OIR
490 NEXT OIR
510 SOUND 0,0,0,0
520 GOTO 590
530 IF NUM=32 THEN GOTO 230
535 Y=7:N(4)=32
540 FOR OIR=11 TO 15:POSITION OIR,Y:
? #6: " ":FOR W=1 TO 5:NEXT W:POS
ITION OIR,Y: ? #6: " ":Y=Y+1
550 SOUND 0,OIR*10,10,OIR
560 NEXT OIR
580 SOUND 0,0,0,0
590 IF LASTNUM>NUM THEN 610:REM CHEC
K FOR INCORRECT ANSWER
600 GOTO 620
605 REM *** ERROR ROUTINE FOLLOWS
610 SCORE=SCORE-NUM:POSITION 15,6: ?
#6:SCORE
615 FOR W=1 TO 125:SOUND 0,NUM,6,10:
NEXT W:SOUND 0,0,0,0:FOR W=1 TO
500:NEXT W:GOTO 140
615 REM *** CORRECT ANS ROUTINE
620 LASTNUM=NUM:SCORE=SCORE+NUM:POSIT
ION 15,6: ? #6:SCORE:GOTO 230
625 REM *** TITLE ROUTINE FOLLOWS
630 GRAPHICS 17:SCRN=PEEK(88)+256*PE
EK(89)
640 FOR I=1 TO 75
650 POKE SCRN+INT(RND(0)*400),INT(RN
D(0)*26)+33:REM PRINT RANDOM LET
TERS FOR INTRO
660 SOUND 0,I+75,10,8:NEXT I
670 FOR W=1 TO 50:NEXT W
672 POSITION 5,10: ? #6: "-----"
:POSITION 5,12: ? #6: "-----"
"
675 REM *** CHARACTER BETWEEN 'a' A
ND 'b' IS A CONTROL M
680 POSITION 5,11: ? #6:"alpha(M)bias
t":SOUND 0,0,0,0:POSITION 3,23: ?
#6:"0123456789ABCDEF":RETURN
685 REM *** REDEFINE CHARACTER SET
690 CHSET=(PEEK(106)-8)*256:FOR I=0
TO 1023:POKE CHSET+I,PEEK(57344+
I):NEXT I
700 RESTORE 740
710 READ A:IF A=-1 THEN RETURN
720 FOR J=0 TO 7:READ B:POKE CHSET+A
*8+J,B:NEXT J
730 GOTO 710
740 DATA 1,192,224,112,56,31,15,14,1
2
750 DATA 3,12,14,15,31,56,112,224,19
2
760 DATA 4,3,7,14,28,248,240,112,40
770 DATA 5,48,112,240,248,28,14,7,3
780 DATA 6,126,126,126,126,126,126,1
26,126
790 DATA -1
795 REM *** END OF GAME ROUTINE
800 ? #6: "(CLEAR)":SETCOLOR 4,6,0
810 FOR S=80 TO 250:SOUND 2,5,10,0:N
EXT S: ? #6: " (5 SPACES)g m n o p q r
s"
820 ? #6: ? #6: ? #6: "(3 SPACES)score
was ":SCORE:IF SCORE>HIGH THEN H
IGH=SCORE
830 ? #6: ? #6: " high score is ":HIGH
840 ? #6: ? #6: ? #6: " press (F1)S but
ton"
850 SOUND 2,0,0,0:IF STRIG(0)=0 THEN
130
860 GOTO 800

```

Program 2: Alpha Blast - VIC


```

10 POKE55,0:POKE56,28:CLR:OIMN(3),P(3),J(
3),D(3):GOSUB240:HI=0
20 RO=0:SC=0:TT=50
30 LA=0:PRINT"(CLR){OOWN}":PORT=1TO10:PRI
NT"[REO]{RVS}0{YEL}{OFF}1":NEXT
40 POKE7822,31:RO=RO+1:PRINT"[HOME]{GRN}
{RVS}ROUND"RO:TAB(10)"{RVS}SCORE"SC
50 TT=TT-2
60 FORI=0TO3
70 N(I)=INT(RND(1)*26)+129:IFI=0THEN100
80 FORJ=0TOI-1:IFN(J)=N(I)THEN70
90 NEXT
100 POKEP(I),N(I):NEXT
110 JY=PEEK(37151)+PEEK(37152)
120 IFT=1THEN320
130 FORI=0TO3:IFJ(I)=JYTHENPOKE7822,27+I:
NU=PEEK(P(I)):GOTO170

```

SPELUNKER™

A spine-tingling adventure in a cavern of terror.



Spelunker. It's the fantastic new discovery game for the Atari 400/800 48K Disk with thirty continuous screens of action! The challenge: a fabulous treasure waits somewhere deep within the earth. You are the Spelunker, and between you and riches beyond imagination are darkness and death. Traps and barriers lurk at every turn. Only the skilful and the brave will ever reach the hidden treasure alive.

Spelunker is a joystick controlled journey through an underground nightmare. The deeper you descend, the more difficult and dangerous the challenge. In fact, Spelunker is designed to keep players enthralled through thousands of excursions into its mysterious cavern of terror. With incredibly detailed arcade style graphics and super sound effects, Spelunker is the game of the year, and for years to come.

MICROGRAPHIC IMAGE

9550 Forest Lane, Suite 627
Dallas, Texas 75243
(214) 341-5791



Round 1 is underway in the VIC version of "Alpha Blast."

```

140 NEXT:IFN(0)=32ANDN(1)=32ANDN(2)=32AND
N(3)=32THEN300
150 IPPEBK(162)>TTTHENPOKE36877,200:POKEI
62,0:POKE7681+T*22,32:T=T-1:POKE36877
,0
160 GOTO110
170 IFNU=32THEN110
180 POKE36877,200:L=7822+D(I):FORJ=1TO4:P
OKEL,174:FORW=1TO10:NEXT:POKEI,160
190 L=L+D(I):POKE36878,15-J*3:NEXT:POKEI-
D(I),160:N(I)=32:POKE36877,0:POKE3687
8,15
200 IFLA<NUTHEN230
210 SC=SC-NU:PRINT"[HOME]{RVS}{GRN}"SPC(1
5)SC
220 POKE36875,230:FORW=1TO250:NEXT:POKE36
875,0:FORW=1TO500:NEXT:GOTO300
230 LA=NU:SC=SC+NU:PRINT"[HOME]{RVS}{GRN}"
"SPC(15)SC:GOTO110
240 PRINT"[CLR]":POKE36879,0:POKE36877,0
:POKE36878,15:FORI=1TO75
250 POKE7680+RND(1)*500,RND(1)*26+1
260 POKE36874,I+180:NEXT:POKE36874,0
270 FORW=1TO50:NEXT
280 POKE214,9:PRINT:PRINTSPC(5)"[GRN]-----
-----":PRINT:PRINTSPC(5)"-----
-----"
290 PRINTSPC(5)"[2 UP] ALPHABLAST "
300 FORI=7384TO7439:READA:POKEI,A:NEXT:FO
RI=0TO3:READP(I),J(I),D(I):NEXT
310 POKE37154,127:PRINT"[CLR]":POKE36869,
255:RETURN
320 PRINT"[CLR]{GRN}":FORI=250TO129STEP-1
:POKE36875,S:NEXT:POKE36875,0:PRINTSP
C(5)"[RVS]GAME OVER"
330 PRINT"[2 DOWN]{RVS}[3 SPACES]SCORE WA
S"SC:IFSC>HITHENHI=SC
340 PRINT"[DOWN]{RVS} HIGH SCORE IS"HI
350 PRINT"[2 DOWN]{RVS}[2 SPACES]PRESS
[WHIT]FIRE[GRN] BUTTON"
360 IF(PEEK(37151)AND32)THEN360
370 GOTO20
380 DATA192,224,112,56,31,15,14,12, 12,14
,15,31,56,112,224,192
390 DATA3,7,14,28,248,240,112,48, 48,112,
240,248,28,14,7,3
400 DATA126,126,126,126,126,126,126,126
410 DATA0,0,0,0,0,0,0,0,255,255,255,255,2
55,255,255,255

```

420 DATA7730,353,-23,7906,349,21,7730,241
,-21,7914,237,23

Program 3: Alpha Blast - Color Computer

Version by Todd Kourmian, Programming Assistant

```

10 DIMA(156)
20 FORI=1TO156:READB:A(I)=B:NEXT
40 CLS0:PRINT010,"ROUND 1":PRINT016,
"SCORE 0":
50 FORI=0TO4:FORJ=0TO2*I:SET(45-I+J
,10+I,3):SET(46+I,10+I,3):NEXT:N
EXT
60 FORI=4TO0STEP-1:FORJ=0TO2*I:SET(
45-I+J,15+4-I,3):SET(46+I,15+4-I
,3):NEXT:NEXT
70 FORI=0TO1:SET(42+I,11+I,8):SET(4
9-I,11+I,8):SET(42+I,18-I,8):SET
(49-I,18-I,8):NEXT
80 FORI=1034TO1044:POKEI,32:NEXT
90 PRINT010,"ROUND 1":PRINT019,"SCORE
0":
99 SC=0:TM=9
100 FORI=0TO25STEP2:SET(0,1,8):NEXT
:BL=10:Q0=0:FORI=1TO4:TT(I)=0:N
EXT:TI=0:LM=0
110 N(1)=RND(26)
120 N(2)=RND(26):IFN(2)=N(1)THEN120
130 N(3)=RND(26):IFN(3)=N(1)ORN(3)=
N(2)THEN130
140 N(4)=RND(26):IFN(4)=N(1)ORN(4)=
N(2)ORN(4)=N(3)THEN140
150 FORI=1TO4:S(I)=(N(I)-1)*6+1:NEX
T:GOSUB200:GOSUB210:GOSUB220:GO
SUB230
160 R=R+1:R$=STR$(R):FORI=2TOLEN(R$
):RO$=MID$(R$,I,1):POKEI038+I,V
AL(RO$)+48:NEXT
162 IFR/3=INT(R/3)THENTM=TM-1
165 GOTO300
200 FORI=0TO5:CR(I)=A(I+S(1))+144:N
EXT
205 FORI=0TO5:PRINT0(32*INT((I/2)+1
)+(I AND 1))+16,CHR$(CR(I)):NE
XT:RETURN
210 FORI=0TO5:CR(I)=A(I+S(2))+208:N
EXT
215 FORI=0TO5:PRINT0(32*INT((I/2)+1
)+(I AND 1))+20,CHR$(CR(I)):NE
XT:RETURN
220 FORI=0TO5:CR(I)=A(I+S(3))+224:N
EXT
225 FORI=0TO5:PRINT0(32*INT((I/2)+1
)+(I AND 1))+16,CHR$(CR(I)):N
EXT:RETURN
230 FORI=0TO5:CR(I)=A(I+S(4))+192:N
EXT
235 FORI=0TO5:PRINT0(32*INT((I/2)+1
)+(I AND 1))+28,CHR$(CR(I)):N
EXT:RETURN
300 X=JOYSTK(0):Y=JOYSTK(1)
310 IFX<BANDY<0THENTM=1:GOTO370
320 IFX<55ANDY<0THENTM=2:GOTO370
330 IFX<BANDY<55THENTM=3:GOTO370
340 IFX<55ANDY<55THENTM=4:GOTO370
350 TI=TI+1:IF TI<TM THEN330
351 BL=BL-1:IFBL=0THEN1000
352 RESET(0,2*(BL-1)+8):TI=0:SOUND1
,1:GOTO350
370 IF TI=1 THEN350
380 FORI=0TO5:CR(I)=128:NEXT

```

WE INTERRUPT THIS AD TO BRING YOU THIS IMPORTANT PROGRAM...

Now you could add **your** program to the rapidly expanding list of MMG Software with MMG's **Write Your Own Program Contest!** Each month a program will be chosen and developed from the entries and suggestions sent in by **you** and best of all, the winners will receive royalties from the sale of their entry. You don't have to be a computer whiz to enter, so see your local retailer who carries ATARI products for details. **FINAL FLIGHT** is only one of the many exciting and useful programs for the ATARI system now available from MMG Micro Software that are designed with you in mind. At MMG, we believe that people are as important as the programs they use.



MMG

micro software

P.O. Box 131 Marlboro, NJ 07746
(201) 431-3472

```

385 NM=N(T):IF LK<NM THEN387
386 SC=SC-(NM*96):GOTO390
387 SC=SC+NM*96:LM=NM
390 ON T GOSUB400,410,420,430
395 LC=1048:GOSUB2000
396 IFLM>NM THENGOSUB205:GOSUB215:
GOSUB225:GOSUB235:FORI=1TO4:TT(
I)=1:NEXT
397 FORI=1TO4:Q0=Q0+TT(I):NEXT:IFQ0
=4THEN100
398 Q0=0:GOTO350
400 FORI=41TO35STEP-1:SET(I,1-31,3)
:NEXT:FORI=41TO35STEP-1:RESET(I
,1-31):NEXT:GOSUB205:GOTO440
410 FORI=50TO56:SET(I,60-1,3):NEXT:
FORI=50TO56:RESET(I,60-1):NEXT:
GOSUB215:GOTO440
420 FORI=41TO35STEP-1:SET(I,60-1,3)
:NEXT:FORI=41TO35STEP-1:RESET(I
,60-1):NEXT:GOSUB225:GOTO440
430 FORI=50TO58:SET(I,1-31,3):NEXT:
FORI=50TO58:RESET(I,1-31):NEXT:
GOSUB235
440 TT(T)=1:T=0:F=0:RETURN
1000 CLS0:PRINT046,"00000":PRINT051
,"00000":PRINT0105,"00000":PRI
NT0110,"00000":PRINT0116,"0000
0"
1010 LC=1142:GOSUB2000
1011 GOTO1011
2000 SC=STR$(SC):FORI=2TOLEN(SC):
DD=MOD$(SC,I,1):POKELC+I,VAL
(DD)+40:NEXT:POKELC+1,32:POKE
LC+1+1,32:RETURN
10000 DATA 6,9,11,7,8,4,14,9,14,13,
12,8,14,12,10,8,12,12,14,9,10
,5,12,8,14,12,14,8,12,12
10010 DATA 14,12,14,8,8,8,14,8,10,1
3,12,12,10,5,14,13,8,4,13,14,
5,10,12,12,4,14,2,10,4,8,10,6
,14,2,8,4
10020 DATA 10,0,10,0,12,12,9,6,10,5
,8,4,15,5,10,15,8,4,14,13,10,
5,12,12,14,13,14,12,8,0
10030 DATA 14,13,10,6,12,4,14,13,14,
9,8,4,14,12,12,13,12,13,1
4,5,10,4,8,10,5,10,5,12,12
10040 DATA 10,5,9,6,4,8,10,5,9,6,8,
4,10,5,6,9,8,4,9,6,5,10,4,8,1
2,14,6,0,12,12

```

Program 4: Alpha Blast - TI-99/4A

Extended BASIC Version by Pat Parrish, Programming Supervisor

```

100 GOSUB 510
110 RANDOMIZE
120 DIM N(3)
130 CALL CLEAR :: CALL SCREEN(16)
140 CALL HCHAR(8,5,120,24):: DISPLA
Y AT(10,4)::"A L P H A -- B L A
S T" :: CALL HCHAR(12,5,120,24)
150 CALL MAGNIFY(2):: FOR L=1 TO 20
160 CALL SPRITE(L,INT(RND*26)+65,I
NT(RND*13)+5,INT(RND*24)*8+1,IN
T(RND*32)*8+1,INT(RND*60)-30,IN
T(RND*60)-30)
170 IF L=25 THEN DISPLAY AT(21,10):
"GET READY!"

```

TI-99/4A Version Notes

Pat Parrish, Programming Supervisor

The object of the TI-99/4A version of Alpha Blast (written in Extended BASIC) is to indicate within a certain time the alphabetical order of four scrambled letters appearing on the screen. In its present form, the game requires a joystick. Moving the joystick in the direction of any letter will cause that letter to disappear. At the same time, the order of this response is recorded.

After you have guessed the sequence of the first four letters, a new round begins with the appearance of four new letters. As the game continues, you are given less and less time to respond. The game ends when you can no longer provide four responses within the allotted time.

Scoring for the game is calculated in lines 470 and 480. It is based on three factors: the round number, the time that it took you to respond, and the order of your answers. The faster you can provide the correct answers, the higher will be your score. For an incorrect response, points are deducted at a rate one and a half times the number awarded for correct answers.

To convert this game to keyboard control, substitute the following lines:

```

330 CALL KEY(0,X,ST):: IF ST=0 THEN
CALL HCHAR(ROW,6,32):: ROW=ROW
-U :: IF ROW<5 THEN 400 ELSE 33
0
340 IF (X=69)*(A) THEN CALL PATTERN(
#2,32,#6,43):: V(T)=0 :: A=0 ::
GOTO 390
350 IF (X=68)*(B) THEN CALL PATTERN(
#3,32,#6,43):: V(T)=1 :: B=0 ::
GOTO 390
360 IF (X=88)*(C) THEN CALL PATTERN(
#4,32,#6,43):: V(T)=2 :: C=0 ::
GOTO 390
370 IF (X=83)*(D) THEN CALL PATTERN(
#5,32,#6,43):: V(T)=3 :: D=0 ::
GOTO 390

```

```

180 NEXT L :: CALL DELSPRITE(ALL)::
CALL CLEAR :: HS=0
190 CALL COLOR(12,6,1)
200 DISPLAY AT(1,6)::"HIGH SCORE:";H
S :: U=0 :: R=0 :: SC=0
210 U=U+.03*SGN(1-U):: R=R+1 :: DI
SPLAY AT(5,14)::"ROUND #";R :: DI
SPLAY AT(2,6)::"SCORE:
(5 SPACES);SC
220 FOR I=6 TO 21 :: CALL HCHAR(I,6
,120):: NEXT I
230 FOR I=5 TO 7 STEP 2 :: CALL VCH
AR(5,1,95,17):: NEXT I
240 FOR I=3 TO 9 STEP 6 :: CALL VCH
AR(4,1,120,20):: NEXT I :: CALL

```




GWENDOLYN.

THERE ARE SOME THINGS YOU KEEP SEARCHING FOR, BEYOND REASON.

Kidnapped in revenge and locked in hatred somewhere deep beneath your castle, is your princess.

Gwendolyn.

The prosperity of your kingdom, the end of a bitter feud, your very future depend on finding her.

You swear that no obstacle can stop you. But the high-resolution, 3-D graphics, animation and sound effects make the obstacles that await you more formidable than you can imagine.

And with over ninety different screens and two full sides of play, those obstacles and the decisions you must make can appear endless. In fact, you may have to endure hours of searching to rescue Gwendolyn.

But for her, you would endure anything, wouldn't you?

Gwendolyn—a non-violent, intermediate graphic adventure game, written by Marc Russell Benioff, Atari 40K Disk \$27.95, Artworx Software Co., Inc., 150 N. Main St., Fairport, N.Y. 14450. For a free catalog of Artworx Software for the Atari, Apple, VIC-20 & Commodore 64 computers, write or call 800-828-6573.



These are just
three of over
ninety exciting
screens.

Artworx®
So you can play.



TI version of "Alpha Blast."

```

HCHAR{4,4,120,5}:: CALL HCHAR(
23,4,120,5)
250 FOR I=0 TO 3
260 N(I)=INT(RND*26)+65
270 FOR J=0 TO I-1 :: IF N(J)=N(I) T
HEN 260
280 NEXT J :: NEXT I
290 CALL SPRITE(#6,42,3,97,153)
300 CALL SPRITE(#2,N(0),14,57,153):
:: CALL SPRITE(#3,N(1),14,97,201
):: CALL SPRITE(#4,N(2),14,137,
153):: CALL SPRITE(#5,N(3),14,9
7,105)
310 ROW=21 :: A=-1 :: B=-1 :: C=-1
:: D=-1
320 T=0
330 CALL JOYST(1,X,Y):: IF ABS(X)+A
BS(Y)>4 THEN CALL HCHAR(ROW,6,
32):: ROW=ROW-U :: IF ROW<5 THE
N 400 ELSE 330
340 IF (X=0)*(Y=4)*(A) THEN CALL PAT
TERN(#2,32,#6,43):: V(T)=0 :: A
=0 :: GOTO 330
350 IF (X=4)*(Y=0)*(B) THEN CALL PAT
TERN(#3,32,#6,43):: V(T)=1 :: B
=0 :: GOTO 330
360 IF (X=0)*(Y=-4)*(C) THEN CALL PA
TTERN(#4,32,#6,43):: V(T)=2 ::
C=0 :: GOTO 330
370 IF (X=-4)*(Y=0)*(D) THEN CALL PA
TTERN(#5,32,#6,43):: V(T)=3 ::
D=0 :: GOTO 330
380 CALL HCHAR(ROW,6,32):: ROW=ROW-
U :: IF ROW<5 THEN 400 ELSE 330
390 CALL SOUND(-10,200,2):: CALL PA
TTERN(#6,42):: T=T+1 :: IF T=4
THEN 450 ELSE 330
400 DISPLAY AT(22,11): "YOUR TIME IS
UP!"
410 CALL SOUND(800,110,5,120,5):: F
OR I=1 TO 200 :: NEXT I
420 DISPLAY AT(24,10): "PLAY AGAIN(Y
/N)?" :: IF SC>HS THEN HS=SC
430 CALL KEY(0,KEY,ST):: IF ST=0 TH
EN 430
440 IF (KEY=89)+(KEY=121) THEN CALL
CLEAR :: CALL DELSPRITE(ALL)::
GOTO 200 ELSE 560

```

```

450 REM EVALUATE ANSWERS
460 FOR T=0 TO 2 :: IF N(V(T))<N(V(
T+1)) THEN 480
470 SC=SC-INT(1.5*R*ROW):: GOTO 490
480 SC=SC+INT(R*ROW)
490 NEXT T
500 CALL DELSPRITE(ALL):: GOTO 210
510 REM CHAR
520 CALL COLOR(14,9,1)
530 CALL CHAR(120,"007E7E7E7E7E00
"):: CALL CHAR(120,"")
540 CALL COLOR(12,6,10):: CALL COLO
R(13,1,9)
550 RETURN
560 END

```



ComputAbility™

Active ProWriter Compact Discs Musak Memory Board Elephant Disks Sonoson Joysticks Monkey Wrench II Omnisystem

DISK DRIVES ▶ PERCOM-ASTRA-RANA-TRAK
THE LARGEST ATARI MAIL ORDER COMPANY
PRESENTS THE LARGEST SELECTION OF THIRD
PARTY COMPATIBLE PRODUCTS
(800) 558-0003 In Wisconsin (414) 351-2007
 ComputAbility • P.O. Box 17862 • Milwaukee, WI 53217
CALL FOR FREE CATALOG

NEW!

MAG-RAK



AT LAST!
MAGAZINE PROGRAM
COPYING WITH EASE

MAG-RAK HOLDS YOUR
MAGAZINE IN A CONVENIENT
AND COMFORTABLE POSITION
WHILE YOU ENTER PROGRAMS
INTO YOUR COMPUTER —
— A LINE AT A TIME
— A PAGE AT A TIME

NOW YOU CAN
— CUT PROGRAM COPYING TIME
— REDUCE ERRORS
— SAVE VALUED MAGAZINES, INTACT

\$34.95 POSTPAID

CALIF. RES. ADD 6½% SALES TAX
CANADA — ADD \$2
CHECK OR MONEY ORDER (ONLY) TO:

R&L PRODUCTS
BOX 26A89
LOS ANGELES, CA 90026

Christmas Special

Get one game **FREE** when you buy any
2 Showcase Software games for the VIC-20®
at \$19.95 each. But hurry! Offer ends Dec. 25, 1983.

ASTRO PATROL

In space there are no guarantees....All your training and superb equipment—will it be enough to save you from the alien hordes?



CHICKEN

A pesky old fox has found Ma Hen's eggs and she's trying to save them from his deadly clutches. Play action intense enough to challenge the most experienced arcade player.

SQUEEZE

The fields are dry. You hafta dig a heap o' ditches! But you better be nimble 'cause the bulls they gonna chase you down. So pick up your shovel and start diggin' your way to fun and fast action!



GLUB GLUB

The map was right! Under the boat the unmistakable glitter of gold. A king's ransom! But those dark forms can only be...sharks! Can you conquer your fear and avoid those dark marauders?

DOUGHBOY

The bugle call has sounded. It's time to hit the trenches for a fun-filled contest of bravery and tactics. Your mission: Recover the supplies that are scattered across the playfield while avoiding enemy troops.



PUSSYFOOTIN'

Meet Fearless Franklin the guard cat. His job: catching nasty gristlebirds and keeping things running smoothly for his hard hat buddies. But won't anything stand still?

SALMON RUN

Sammy the seafaring salmon is back to see his fishy fiancé. But he has to meet her upstream and there are waterfalls, hungry bears, anglers and bothersome birds at every bend. But Sammy is determined to give you hours of fishy fun!



Attach the end flaps and receipts from any 2 of the Showcase Software games shown here and indicate your choice of a free Showcase game. Or order direct using the handy coupon (add \$2 shipping and handling). Phone orders accepted. Free game available only from Showcase Software.

SHOWCASE SOFTWARE

5221 Central Ave., Richmond, CA 94804

Here's my order for 2 Showcase Software VIC-20® games and my choice of free game.

Name _____

Address _____

City _____ State _____ Zip _____

Games Wanted: _____

Free Game: _____

MasterCard/Visa No: _____

SHOWCASE SOFTWARE

5221 Central Avenue, Richmond, CA 94804

(415) 527-7751

PATHWAY

George Trepal

"Pathway" is not a typical computer game. The computer is not an opponent - it simply keeps track of the game you play against another person. For VIC, 64, and Apple.

The rules of the game are simple, but there are a few catches. Each player (two or three can play) starts off with four tokens at the start of a path. The first player to get all four tokens to the end of the path is the winner.

To play, push the VIC's F7 key. The machine will return the number of spaces you can move. Each token is numbered 1, 2, 3, or 4. Press the appropriate number key for the token you want moved. If your token lands on another player's token, that token is sent back to the start of the path. If you land on your own token, that token becomes invisible until it is moved. As you play, you'll see that a wise strategy is required to win.

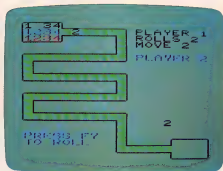
The VIC version is written for the unmodified VIC, so disconnect any extra memory (except for the Super Expander).

Game Movement Logic

The positions of the tokens are stored in arrays and updated as the tokens are moved. Once a move is made, the arrays are compared to see if a token should be sent back to the start. The position of a token is a number which represents how many cells away the token is located from the start of the path.

Each cell corresponds to a certain screen location, all of which are stored in DATA statements. For example, if a token were moved from cell 24 to cell 31, the machine would read the DATA from the start and put a path character in position 24 to erase the token. It would then return to the start of DATA and read to the thirty-first location, where the token is then printed to the screen.

The 64 version is almost identical in play to the VIC version, although the playing field is larger. The Apple version uses the space bar instead of the F7 key used by the Commodore versions.



Player 2 is about to roll the dice in the VIC version of "Pathway."

If you'd rather not type in the program (VIC version only), send \$3, a blank tape or disk, and an SASE to:

George Trepal
2650 Alturas Road
Bartow, FL 33830

BEFORE TYPING...

If you're new to computing, please read "How To Type COMPUTE!'s Programs" and "A Beginner's Guide To Typing In Programs."

Program 1: Pathway For VIC

```
1 D$="{HOME}[12 DOWN]":CC=38728:ES="{HOME}[7 DOWN]":POKE36879,25
2 DIMAS(23)
3 PRINT"[CLR][BLK][5 DOWN][2 SPACES]2 OR 3 PLAYERS";:GOSUB88:IPM<2ANDM<3THEN 3
4 P=M:PRINT"[CLR]";:GOSUB56:GOSUB58
5 VO=36878:TN=36875
6 FORJ=1TO4:POKE38834+J,0:POKE38856+J,6:POKE38878+J,2:NEXT
7 PRINT$+"[8 DOWN][8 SPACES]";
8 DEFFNA(X)=INT(RND(1)*9)+1
```

Tough competition.



The world may be short of oil. And short of jobs. But there's no shortage of entertainment. Arcades. Movies. Amusement parks. TV. Concerts. Records. You've got your choice. And every day, more of you are choosing HesWare™ computer games.

That's because only the best games earn the HesWare title. Tough, challenging, arcade quality action games like Gridrunner,™ Predator,™ Retro Ball,™ and Robot Panic.™

Mind-bending strategy and role playing adventures like Pharaoh's Curse™ and Oublette.™

Zany new titles that have to be seen to be believed. Would you believe Attack of the Mutant Camels™??

You don't need an expensive computer to enjoy HesWare action, either. HesWare programs are available on cartridge, diskette or cassette for VIC 20,™ Commodore 64,™ Atari® and IBM® personal computers.

When you pick up a HesWare game, you know it's ready for the toughest test of all: beating out the tough competition for your attention.

HesWare games. Just one of the ways HesWare is expanding the computer experience. Look for them at your favorite software retailer.

VIC 20 and Commodore 64 are trademarks of Commodore Electronics Ltd. Atari is a registered trademark of Atari, Inc. IBM PC is a registered trademark of International Business Machines. Pharaoh's Curse is a trademark of Synapse Software. Oublette is a trademark of ISA Software.

**Pleases the
tough
customer.**

HesWare.

Human Engineered Software
150 North Hill Drive
Brisbane, CA 94005
800-227-6703
(in California
800-632-7979)
Dept. C20



```

9 FORJ=1TO4:AA(J)=7702+J:POKEAA(J),48+J:
POKEAA(J)+CC,0:NEXTJ
10 FORJ=1TO4:BB(J)=7724+J:POKEBB(J),48+J:
POKEBB(J)+CC,6:NEXTJ
11 FORJ=1TO4:CC(J)=7746+J:POKECC(J),48+J:
POKECC(J)+CC,2:NEXTJ
12 GOSUB87:PRINT"[HOME]{2 DOWN}[BLK]"SPC
(13)"PLAYER 1";
13 POKE7765,32:POKE7786,32
14 GOSUB77:PRINT"[HOME]{3 DOWN}[BLK]"SPC
(13)"ROLLS";V
15 PRINT"[HOME]{4 DOWN}"SPC(13)"MOVE";
16 GOSUB88:IFM<LORM>4THEN15
17 PRINTM:IFA(M)=0THENPOKEAA(M),32
18 IFA(M)>0THENCV=A(M):GOSUB84
19 IFV+A(M)>70THENPOKEB114+M,48+M:A(M)=7
1:GOTO24
20 A(M)=A(M)+V:RESTORE:FORJ=1TOA(M):READ
X:NEXT:POKEK,M+48:POKEK+CC,0
21 FORJ=1TO4:IFB(J)<>0ANDB(J)=A(M)THENB(
J)=0:POKEBB(J),48+J:GOSUB86
22 NEXT:FORJ=1TO4:IFC(J)<>0ANDC(J)=A(M)T
HENC(J)=0:POKECC(J),48+J:GOSUB86
23 NEXT
24 GOSUB87:PRINT"[HOME]{6 DOWN}[BLU]"SPC
(13)"PLAYER 2";
25 POKE7853,32:POKE7874,32
26 GOSUB77:PRINT$SPC(13)"ROLLS";V
27 PRINT$SPC(13)"[DOWN]MOVE";
28 GOSUB88:IFM<LORM>4THEN27
29 PRINTM:IFB(M)=0THENPOKEBB(M),32
30 IFB(M)>0THENCV=B(M):GOSUB84
31 IFV+B(M)>70THENPOKEB136+M,48+M:B(M)=7
1:GOTO36
32 B(M)=B(M)+V:RESTORE:FORJ=1TOB(M):READ
X:NEXT:POKEK,M+48:POKEK+CC,6
33 FORJ=1TO4:IFA(J)<>0ANDA(J)=B(M)THENA(
J)=0:POKEAA(J),48+J:GOSUB86
34 NEXT:FORJ=1TO4:IFC(J)<>0ANDC(J)=B(M)T
HENC(J)=0:POKECC(J),48+J:GOSUB86
35 NEXTJ
36 IFP<>3THEN12
37 GOSUB87:PRINT$+"{3 DOWN}[RED]"SPC(13
)"PLAYER 3"
38 POKE7941,32:POKE7962,32
39 GOSUB77:PRINT$+"{4 DOWN}"SPC(13)"ROL
LS";V
40 PRINT$SPC(13)"MOVE";
41 GOSUB88:IFM<LORM>4THEN40
42 PRINTM:IFC(M)=0THENPOKECC(M),32
43 IFC(M)>0THENCV=C(M):GOSUB84
44 IFV+C(M)>70THENPOKEB158+M,48+M:C(M)=7
1:GOTO12
45 C(M)=C(M)+V:RESTORE:FORJ=1TOC(M):READ
X:NEXT:POKEK,M+48:POKEK+CC,2
46 FORJ=1TO4:IFA(J)<>0ANDA(J)=C(M)THENA(
J)=0:POKEAA(J),48+J:GOSUB86
47 NEXT:FORJ=1TO4:IFB(J)<>0ANDB(J)=C(M)T
HENC(J)=0:POKEBB(J),48+J:GOSUB86
48 NEXT:GOTO12
49 GOTO49
50 DATA7729,7738,7731,7732,7733,7734,773
5,7757,7779,7801,7823,7822,7821,7820,
7819,7818
51 DATA7817,7816,7815,7814,7813,7835,785
7,7879,7880,7881,7882,7883,7884,7885,
7886,7887
52 DATA7888,7889,7911,7933,7955,7954,795
3,7952,7951,7950,7949,7948,7947,7946,
7945,7967
53 DATA7989,8011,8012,8013,8014,8015,801
6,8017,8018,8019,8020,8021,8043,8065,
8087,8109
54 DATA8131,8132,8133,8134,8135,8136
55 FORJ=1TO70:READX:POKEK,95:POKEK+CC,5:
NEXTJ:RESTORE:RETURN
56 AS(1)="[4 03]"
57 AS(2)="[EM3]{4 SPACES}[L6 03]"
58 AS(3)="[EM3]{11 SPACES}[EG3]"
59 AS(4)="[EM3]{4 SPACES}[Q4 T3P EG3]"
60 AS(5)="[4 T3]{5 SPACES}[EM3 EG3]"
61 AS(6)="[9 030 EG3]"
62 AS(7)="[EM3]{11 SPACES}[EG3]"
63 AS(8)="[EM3 DE9 T3]"
64 AS(9)="[EM3 LE9 03]"
65 AS(10)=AS(7)
66 AS(11)="[9 T3P EG3]"
67 AS(12)="[9 030 EG3]"
68 AS(13)=AS(7)
69 AS(14)=AS(8):AS(15)=AS(9):AS(16)=AS(1
0):AS(17)=AS(11)
70 AS(18)="[10 SPACES][EM3 EG3]"
71 AS(19)="[10 SPACES][EM3 EG3
{4 SPACES}[4 03]"
72 AS(20)="[10 SPACES][EM3 LE3 030
{4 SPACES][EG3]"
73 AS(21)="[10 SPACES][EM3]{10 SPACES}
[EG3]"
74 AS(22)="[11 SPACES][5 T3P{4 SPACES}
[EG3]"
75 AS(23)="[17 SPACES][4 T3]"
76 FORJ=1TO19:PRINTAS(J):NEXT:FORJ=20TO2
3:PRINTAS(J):NEXT:RETURN
77 PRINTDS+"[6 DOWN] PRESS P7";
78 PRINTDS+"[7 DOWN] TO ROLL";
79 IFPEEK(197)=63THEN81
80 GOTO79
81 V=FNA(1):POKE198,0
82 FORJ=1TOV:POKE8048,48+J:POKE38768,0:P
ORT=1TO100:NEXT:POKEVO,15:POKETN,200:
POKEVO,0
83 NEXT:RETURN
84 IFCV<70THENCV=70
85 RESTORE:FORJ=1TOCV:READX:NEXT:POKEK,9
5:POKEK+CC,5:RETURN
86 POKEVO,15:POKETN,250:PORT=1TO700:NEXT
:POKEVO,0:RETURN
87 POKEVO,10:POKETN,128:PORT=1TO200:NEXT
:POKEVO,0:RETURN
88 GETM$:ON-(M$="")GOTO88:M=VAL(M$):RETU
RN

```

Program 2: Pathway For The 64

```

100 DS="[HOME]{12 DOWN}":CC=54272:ES="
[HOME]{7 DOWN}":POKE53281,1:POKE53280
,14:SO=CC
110 DIMAS(23):FORT=SOTOSO+24:POKET,0:NEXT
:POKESO+24,15:POKESO+5,34:POKESO+6,24
4
115 PRINT"[CLR]{7 DOWN}[15 RIGHT]PATHWAYS
"
120 PRINT"[BLK]{4 DOWN}[10 RIGHT]
{2 SPACES}[2 OR 3 PLAYERS";
125 GOSUB960:IFM<>2ANDM<>3THEN125
130 P=M:PRINT"[CLR]":GOSUB650:GOSUB590
140 VO=36878:TN=36875
150 FORJ=1TO4:POKE1104+CC+J,0:POKE1144+CC
+J,6:POKE1184+CC+J,2:NEXT

```

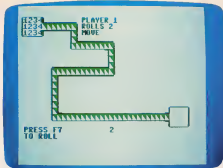
HELP WANTED:



Ario is a hard-working plumber, but a touch absent-minded. He's building a water supply system for the whole neighborhood, and he really has his hands full. Help Ario decide what kind of pipe to buy and where to put it. . . his limited budget doesn't leave him much margin for error. Figure out the shortest, most economical way to get everyone hooked up . . . and just hope poor Ario has remembered to open and close the right valves. A marvelously entertaining and challenging exercise in planning, economics and spatial relationships for all ages.

PIPES. For the VIC-20 and Commodore 64.

C R E A T I V E S O F T W A R E



64 version of "Pathway."

```

160 PRINTD$+"{8 DOWN}{8 SPACES}";
170 DEFFNA(X)=INT(RND(1)*9)+1
180 FORJ=1TO4:AA(J)=1104+J:POKEAA(J),48+J
   :POKEAA(J)+CC,0:NEXTJ
190 FORJ=1TO4:BB(J)=1144+J:POKEBB(J),48+J
   :POKEBB(J)+CC,6:NEXTJ
200 FORJ=1TO4:CC(J)=1184+J:POKECC(J),48+J
   :POKECC(J)+CC,2:NEXTJ
210 GOSUB950:PRINT"[HOME]{2 DOWN}[BLK]"SP
   C(13)"PLAYER 1";
220 POKE1163,32:POKE1163+CC,0:POKE1202,32
   :POKE1202+CC,0
230 GOSUB850:PRINT"[HOME]{3 DOWN}[BLK]"SP
   C(13)"ROLLS";V
240 PRINT"[HOME]{4 DOWN}[BLK]"SPC(13)"MOV
   E";
250 GOSUB960:IFM<10M>4THEN240
260 PRINTM:IFA(M)=0THENPOKEAA(M),32
270 IFA(M)>0THENCVC=A(M):GOSUB920
280 IFV+A(M)>65THENPOKE1695+M,48+M:POKE16
   95+M+CC,0:A(M)=66:GOTO330
290 A(M)=A(M)+V:RESTORE:FORJ=1TOA(M):READ
   X:NEXT:POKEX,M+48:POKEX+CC,0
300 FORJ=1TO4:IFB(J)<>0ANDC(J)=A(M)THENB(
   J)=0:POKEBB(J),48+J:GOSUB940
310 NEXT:FORJ=1TO4:IFC(J)<>0ANDC(J)=A(M)T
   HENC(J)=0:POKECC(J),48+J:GOSUB940
320 NEXT
330 GOSUB950:PRINT"[HOME]{2 DOWN}
   {10 RIGHT}[BLU]"SPC(13)"PLAYER 2";
340 POKE1173,32:POKE1173+CC,6:POKE1212,32
   :POKE1212+CC,6
350 GOSUB850:PRINT"[HOME]{3 DOWN}
   {10 RIGHT}[BLU]"SPC(13)"ROLLS";V
360 PRINT"[HOME]{4 DOWN}{10 RIGHT}"SPC(13)
   )"MOVE";
370 GOSUB960:IFM<10M>4THEN360
380 PRINTM:IFB(M)=0THENPOKEBB(M),32
390 IFB(M)>0THENCVC=B(M):GOSUB920
400 IFV+B(M)>65THENPOKE1735+M,48+M:POKE17
   35+M+CC,6:B(M)=66:GOTO450
410 B(M)=B(M)+V:RESTORE:FORJ=1TOB(M):READ
   X:NEXT:POKEX,M+48:POKEX+CC,6
420 FORJ=1TO4:IFA(J)<>0ANDC(J)=B(M)THENA(
   J)=0:POKEAA(J),48+J:GOSUB940
430 NEXT:FORJ=1TO4:IFC(J)<>0ANDC(J)=B(M)T
   HENC(J)=0:POKECC(J),48+J:GOSUB940
440 NEXTJ
450 IFP<>3THEN210
460 GOSUB950:PRINT"[HOME]{2 DOWN}
   {19 RIGHT}[RED]"SPC(13)"PLAYER 3"
470 POKE1182,32:POKE1182+CC,2:POKE1221,32
   :POKE1221+CC,2
480 GOSUB850:PRINT"[HOME]{3 DOWN}
   {19 RIGHT}[RED]"SPC(13)"ROLLS";V
490 PRINT"[HOME]{4 DOWN}{19 RIGHT}[RED]"S
   PC(13)"MOVE";
500 GOSUB960:IFM<10M>4THEN490
510 PRINTM:IFC(M)=0THENPOKECC(M),32
520 IFC(M)>0THENCVC=C(M):GOSUB920
530 IFV+C(M)>65THENPOKE1775+M,48+M:POKE17
   75+M+CC,2:C(M)=66:GOTO210
540 C(M)=C(M)+V:RESTORE:FORJ=1TOC(M):READ
   X:NEXTJ:POKEX,M+48:POKEX+CC,2
550 FORJ=1TO4:IFA(J)<>0ANDC(J)=C(M)THENA(
   J)=0:POKEAA(J),48+J:GOSUB940
560 NEXT:FORJ=1TO4:IFB(J)<>0ANDB(J)=C(M)T
   HENB(J)=0:POKEBB(J),48+J:GOSUB940
570 NEXT:GOTO210
580 GOTO580
590 DATA 1149,1150,1151,1152,1153,1154,11
   55,1195,1235,1275,1276,1277,1278,1279
600 DATA1280,1281,1282,1283,1323,1363,140
   3,1443,1442,1441,1440,1439,1438,1437
610 DATA 1436,1435,1434,1433,1432,1431,14
   71,1511,1551,1591,1631,1671,1711,1712
620 DATA 1713,1714,1715,1716,1717,1718,17
   19,1720,1721,1722,1723,1724,1725
630 DATA 1726,1727,1728,1729,1730,1731,17
   32,1733,1734,1735
640 FORJ=1TO65:READX:POKEX,95:POKEX+CC,5:
   NEXTJ:RESTORE:RETURN
650 A$(1)=" 4 03"
660 A$(2)="E3{4 SPACES}L66 P3"
670 A$(3)="E3{11 SPACES}E3"
680 A$(4)="E3{4 SPACES}04 Y3P E3"
690 A$(5)=" 4 T3{5 SPACES}E3 L
   7 P3"
700 A$(6)="10 SPACES}E3{9 SPACES}
   E3"
710 A$(7)="11 SPACES}7 T3P E3"
720 A$(8)="18 SPACES}E3 E3"
730 A$(9)="7 SPACES}11 P3 E3 "
740 A$(10)="6 SPACES}E3{13 SPACES}
   E3"
750 A$(11)="6 SPACES}E3 O11 Y3 "
760 A$(12)="6 SPACES}E3 E3"
770 A$(13)="6 SPACES}E3 E3
   {2 SPACES}"
780 A$(14)="6 SPACES}E3 E3"
790 A$(15)="6 SPACES}E3 E3
   {23 SPACES}E4 03"
800 A$(16)="6 SPACES}E3 L22 03@
   {4 SPACES}E3"
810 A$(17)="6 SPACES}E3{29 SPACES}
   E3"
820 A$(18)="7 SPACES}E24 T3P{4 SPACES}
   E3"
830 A$(19)="32 SPACES}E4 T3"
840 FORJ=1TO19:PRINTA$(J):NEXT:PRINT"
   [HOME]":RETURN
850 PRINTD$+"{7 DOWN} PRESS F7";
860 PRINTD$+"{8 DOWN} TO ROLL";
870 IFPEEK(197)=3THEN890
880 GOSUB970:GOTO870

```


**BUY 2
SIERRAVISION
PRODUCTS
GET 1
FREE**



SAVE SIERRA SMITH IN CREEPY CORRIDORS!

Sierra Smith's a real jewel of an adventurer - 24 karats of bravery. Sierra Smith's about ready for the biggest adventure of his life inside Creepy Corridors. Legend has it that some pretty strange critters protect the riches in the maze. The risks are great, but so are the rewards if you survive - enough riches for Smith and you! Above all, be careful as you gather the treasures of Creepy Corridors. Those screams you hear might be your own!



ATARI • COM 64 • VIC 20

```

890 V=FNA(1):POKE198,0:POKES+1,20
900 FORJ=1TOV:POKE1803,48+J:POKE1803+CC,0
    :POKES+4,17:PORT=1TO10
910 POKES+1,J*10:NEXT:POKES+4,16:R
    ETURN
920 IPCV=65THENCV=65
930 RESTORE:FORJ=1TOCV:READX:NEXT:POKEK,9
    5:POKEK+CC,5:RETURN
940 POKES+1,10:POKES+4,33:PORT=1TO700:N
    EXT:POKES+4,32:RETURN
950 POKES+80:POKES+1,80:POKES+4,33:FOR
    T=1TO200:NEXT:POKES+4,32:RETURN
960 GETM$:ON-(M$="")GOTO960:M=VAL(M$):RET
    URN
970 D1=0:PORT=1696TO1699:Z1=PEEK(T):D1=Z1
    +D1:NEXT:IPD1=202THEN WI=1:GOTO1010
980 D2=0:PORT=1736TO1739:Z2=PEEK(T):D2=Z2
    +D2:NEXT:IPD2=202 THENWI=2:GOTO1010
990 D3=0:PORT=1776TO1779:Z3=PEEK(T):D3=Z3
    +D3:NEXT:IPD3=202 THENWI=3:GOTO1010
1000 RETURN
1010 PRINT"[CLR][12 RIGHT)PLAYER";WI;" WI
    NS"
1020 PRINT"[2 DOWN][10 RIGHT)PLAY AGAIN Y
    OR N?"
1030 GET A$:IF A$<>"Y"AND A$<>"N"THEN1030
1040 IF A$="Y"THENRUN

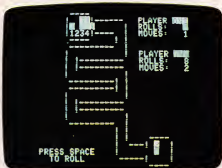
```

Program 3: Pathway – Apple II Version

```

100 TEXT : HOME : VTAB 2: HTAB 16: INVERSE
    : PRINT "PATHWAY": NORMAL
110 VTAB 6: HTAB 8: PRINT "TWO OR THREE
    E PLAYERS?": GET A$:P = VAL (A$
    ): IF P < 2 OR P > 3 THEN 110
120 DIM A$(23),P(70),A(3,4):GV = - 16
    336: HOME : GOSUB 400
130 FOR I = 1 TO 70: READ P(I): NEXT
140 NM$(1) = "ONE":NM$(2) = "TWO":NM$(3
    ) = "THREE":OU(1) = 63:OU(2) = 127
    :OU(3) = 255
150 VTAB 2: HTAB 11: INVERSE : PRINT "
    1234": FLASH : HTAB 11: PRINT "123
    4": NORMAL : HTAB 11: PRINT "1234"
160 FOR I = 1 TO P: PRINT
170 VTAB 21: PRINT " PRESS SPACE":
    HTAB 7: PRINT "TO ROLL"
180 VTAB (5 * I - 3): HTAB 25: PRINT "
    PLAYER "; POKES+50,OU(I): PRINT NM
    $(I): NORMAL : HTAB 25: PRINT "ROL
    L S": "; HTAB 34
190 GET A$: IF A$ < > " " THEN 190
200 V = INT ( RND (1) * 9) + 1: FOR J =
    1 TO V: HTAB 34: PRINT J: FOR K =
    1 TO 200: NEXT : NEXT
210 PRINT : VTAB 21: PRINT " WHICH
    PIECE": HTAB 7: PRINT "TO MOVE"
220 VTAB (I * 5 - 1): HTAB 25: PRINT "
    MOVES: "; HTAB 34
230 GET A$:M = VAL (A$): IF M < 1 OR
    M > 4 THEN 230
240 IF A(I,M) > 70 THEN 230
250 PRINT A$
260 IF A(I,M) = 0 THEN POKE 1033 + 12
    8 * I + M,160: GOTO 290
270 QQ = 160: FOR K = 1 TO 4: IF A(I,K)
    = A(I,M) AND K < > M THEN QQ = K
    + 64 * I - 16
280 NEXT : POKE P(A(I,M)),QQ
290 A(I,M) = A(I,M) + V: IF A(I,M) > 1
    THEN 350
300 A = PEEK (P(A(I,M)))
310 IF A = 160 THEN 340
320 FOR J = 1 TO 3: FOR K = 1 TO 4: IF
    A(J,K) = A(I,M) AND J < > I THEN
    A(J,K) = 0: POKE 1033 + 128 * J +
    K,A: PRINT CHR$(7) CHR$(7):
    NEXT : NEXT
330 PRINT CHR$(7): POKE P(A(I,M)),M
    + 64 * I - 16: GOTO 400
350 POKE 1385 + M + I * 128, I * 64 + M
    - 16:C(I) = C(I) + 1: FOR K = 1 TO
    25: AG = AG + PEEK (GV): NEXT : IF
    C(I) < 4 THEN 400
360 VTAB 17: HTAB 25: PRINT "PLAYER "N
    M$(I)": INVERSE : VTAB 21: HTAB
    5: PRINT "PRESS SPACE": HTAB 4:
    PRINT"TO PLAY AGAIN": NORMAL
370 VTAB 7: HTAB 32
380 GET A$: IF A$ < > " " THEN HOME
    : END
390 RUN
400 NEXT : GOTO 160
410
420 DATA 1294,1295,1296,1297,1298,129
    9,1300,1420,1556,1684,1812,1811,10
    10,1809,1808,1807,1806,1805,1804,1
    803,1802
430 DATA 1930,1074,1202,1203,1204,120
    5,1206,1207,1208,1209,1210,1211,12
    12,1340,1468,1596,1595,1594,1593,1
    592,1591,1590,1589,1588,1587,1586
440 DATA 1714,1842,1970,1971,1972,197
    3,1974,1975,1976,1977,1978,1979,19
    80,1124,1252,1380,1508,1636,1637,1
    638,1639,1640,1641
450
460 A$(1) = "-----"
470 A$(2) = "!!-----"
480 A$(3) = "!!-----"
490 A$(4) = "!!-----"
500 A$(5) = "!!-----"
510 A$(6) = "!!-----"
520 A$(7) = "!!-----"
530 A$(8) = "!!-----"
540 A$(9) = "!!-----"
550 A$(10) = A$(7)
560 A$(11) = "!!-----"

```



Two game pieces have successfully traversed the maze in the Apple version of "Pathway."

**BUY 2
SIERRAVISION
PRODUCTS
GET 1
FREE**



BOIL OVER WITH MR. COOL!

The ice cube cometh - Mr. Cool, the hottest star to ever bounce around the pyro-pyramid. Flaming fireballs blaze a menacing trail as Mr. Cool chills the 24 plates in the pyro-pyramid. Hot springs follow his every move through the inferno. One touch by althor and he's just another puddle. It takes quick flicks of your wrist and a touch of SuperCool to survive. Join Mr. Cool in fast-paced action that will have you bubbling over with excitement!



**Sierra
ON-LINE™**

SIERRA ON-LINE BUILDING COARSEGOLO CA 93611
209 687 6858

APPLE • ATARI • COM 64 • IBM

```

570 A$(12) = "-----" ! "
580 A$(13) = A$(7):A$(14) = A$(8):A$(15
) = A$(9):A$(16) = A$(10):A$(17) =
"-----" ! "
590 A$(18) = " ! "
600 A$(19) = " ! "
610 A$(20) = " ! "
620 A$(21) = " ! "
630 A$(22) = " ! "
640 A$(23) = " ! "
650 FOR J = 1 TO 23: HTAB 10: PRINT A$
(J): NEXT J: RETURN

```

VIC 20 • COMMODORE 64 • ATARI

THERE IS STRENGTH IN NUMBERS JOIN THE SOFTWARE CO-OP

NOW! For the cost of a single game cartridge you can join THE SOFTWARE CO-OP. Use the advantage of bulk purchasing and pay only \$1 over wholesale for games, utilities and educational software. Rock-bottom prices on all equipment and supplies. Savings up to 40%! Guaranteed. Specializing in VIC 20, Commodore 64, Atari, Apple and Sinclair.

Write today for free details about our exciting new catalog and other sensational Co-op benefits including special swap system and free technical assistance.

THE SOFTWARE CO-OP

PO BOX 303 WOB WEST ORANGE, NJ 07052

VIC 20 • COMMODORE 64 • ATARI

SOFTBYTE
HAND TAILORED COMPUTER COVERS

SOFTBYTE computer co. presents:

FOUL WEATHER GEAR FOR YOUR COMPUTER*

Don't expose your computer to harsh elements that can cause premature equipment failure.

We now carry original Designer Jackets which have these special features:

Hand tailored out of durable Rip Stop Nylon, double layered, with elastic gothors.

Designed to fit the Commodore 64, Vic 20, Apple, Atari, and their peripherals.

They're breathable and water resistant.

Available in Royal Blue, Light Blue, Grey, Black, Tan, and reversibles of these colors.

Available at these prices which include tax & shipping: Keyboard Jacket—\$3.50, Cosette Jacket—\$8.50, Disk Jacket—\$10.00, Printer Jacket—\$18.00, Computer Jacket—\$15.00. We offer a special 15% discount when you order three or more. Send check, money order, Master Charge, or Visa (allow three weeks for checks) to:

SOFTBYTE computer company,
p.o. box 5083, Tehoe City, California
95730 916/ 525-4142

Dealer and Distributor inquiries invited.

*GREAT GIFT IDEA!

THE FIRST ANNUAL HACKERS OPEN



★ 1st PRIZE ★
\$1000⁰⁰
and Royalties

★ 2nd PRIZE ★
\$500⁰⁰
and Royalties

★ 3rd PRIZE ★
—UNLIMITED—
\$100⁰⁰ and 1 year
Magnetic Magazine
subscription

Do something with your Programs!
Send them to us and receive \$\$,
royalties, directions, suggestions,
and marketing assistance. Winning
programs will be marketed individu-
ally or as a part of our Magnetic
Magazines. If you have an Atari
400/800, Commodore 64, VIC-20,
TRS-80 Color, IBM PC, Apple II —
you could be a contestant.

For complete information write or
call toll-free:

programmer's institute

a division of FUTUREHOUSE, INC.
p.o. box 3470, chapel hill, north carolina 27514, 919-567-0861

1-800-334-SOFT

PHARAOH'S PYRAMID

Find The Hidden Screen
Within The Game
And Win A
FREE T-SHIRT

LEARN TO BUILD YOUR
PYRAMID
48K • 2 DISK

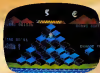
Available Soon For
Commodore 64



It sits on the sands of Egypt—silent, foreboding; the blue waters of the Nile sliding silently by. Pharaoh's Pyramid beckons to us across millennia, mysterious, alluring. Where did the stones come from? How were they laid one on top of another? How many lives were lost under hot suns and cool moons to

provide a resting place for the pharaohs of Egypt? Now you can have a personal stake in its completion. Match wits with the ancient Egyptian God, Osiris. Take advantage of gifts given you by the beautiful Isis. Fight through the plagues of Moses as brick by brick you build one of the wonders of the world. There hasn't been a greater challenge since the original Pharaoh's Pyramid!

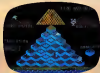
HISTORY PROVES THAT ALL GREAT GAMES HAVE THREE THINGS IN COMMON.



FAST-PACED FUN THAT LASTS



EVER INCREASING CHALLENGE



GRAPHICS THAT LIVE

PHARAOH'S PYRAMID is a fast action game with that special kind of challenge that makes you say...
"This time I go all the way!"

AVAILABLE
NOW FROM...

Master Control Software Inc.

"The company that loves great games as much as you do, see your local dealer or call toll free. 1-800-624-5596

P.O. BOX 26714 • SALT LAKE CITY • UTAH • 84126

Learning With Computers

Glenn M. Kleiman

The stack of new books and magazines on my desk fell over yesterday. I took that as a sign that I should write about some of them in this month's column. I've selected four publications that will be useful to many teachers, parents, and students. The first two concern educational software, and the other two are new dictionaries of computer terms. In future columns, I will review new books on Logo, teaching computer literacy, and other topics.

Courseware Report Card

Each issue of the *Courseware Report Card* contains comprehensive reviews, written by experienced educators, of a variety of educational software packages. All types of educational programs are reviewed, including drill-and-practice, tutorials, simulations, games, authoring systems, classroom management systems, and versions of Logo and turtle graphics. The programs are for Apple, Radio Shack, Atari, and Commodore computers.

Each review begins with a listing of the relevant subject areas, grade level, type of program, hardware requirements, price, and publisher's address. Then there is a brief summary of the program, followed by a very detailed description complete with pictures of the screen displays. Finally, there is an evaluation, divided into ratings of the program's overall performance and content, ease of use (for both students and teachers), error handling, appropriateness as a computer activity for students, documentation, and educational value. In each category, the program is given an A to F grade, and the reviewer explains why. A summary box displays the grades on each of the six criteria.

I find the reviews in the *Courseware Report Card* to be more useful than any others I have seen. I like having a description of the program separate from the evaluation, and the screen pictures help me get a better idea of how the program looks. I also like the fact that the reviewers explain the grade they give the program on each of the criteria, so you can determine whether you agree with their views. This is especially important for

the appropriateness and educational value criteria, since educators disagree about the educational value of different activities and about which types of programs take best advantage of computers.

Courseware Report Card publishes two different sets of reviews — one for programs for elementary school students and the other for secondary school students. Each set can be purchased separately. Reviews are published five times during the school year, with at least 20 reviews each time. Each review is self-contained and three-hole punched, so you can conveniently file your copies by subject area, grade level, hardware compatibility, or however you choose.

Courseware Report Card is published by Educational Insights, Inc., 150 West Carob Street, Comp-ton, CA 90220.

Courseware In The Classroom

Courseware in the Classroom: Selecting, Organizing and Using Educational Software, by Ann Lathrop and Bobby Goodson (published by Addison-Wesley, 1983), would be useful to anyone concerned with finding and evaluating educational software. This book is divided into six sections.

Section 1 presents an overview of how computers can be used in all areas of the curriculum.

Section 2 discusses six categories of software: (1) reinforcement and remediation (that is, drill-and-practice); (2) tutorials; (3) simulations and demonstrations; (4) problem-solving (for example, Logo, logic games); (5) program development aids (PILOT, shell games); and (6) tools for teachers (for example, classroom management and material preparation programs).

Section 3 focuses on criteria for evaluating courseware. The authors begin by discussing the most important general questions to ask: "Does the software meet specific instructional objectives?" and "Does it take good advantage of the computer's capabilities?" They emphasize that there is no point in using computers for activities that could be done just as well without them. They go on to discuss other criteria for content; screen formats; ease of use for students and

The Bear facts:

Now, you can get...

1 NEW software programs featuring Stickybear™ – the hottest-selling computer bear in America.

2 The most sophisticated color graphics ever for the Apple® Personal Computer.

3 New arcade-quality games for families to play together.

4 New fun learning programs for 3- to 6-year-olds created by a world-famous children's author.

5 Disk, plus hard-cover book or game, poster and stickers in a sturdy, attractive vinyl binder – with each program.

There's something new for everyone in your family! The playful animation and bubble-gum colors in the educational programs will captivate your youngest. While Stickybear Basketbounce and Stickybear Bop – games of skill and sharp wits – challenge even dedicated arcade games-players.

Look for Stickybear software – developed by



Early Learning (Ages 3 to 6)

NEW Stickybear Opposites



NEW Stickybear Shapes



Stickybear ABC



Stickybear Numbers

Games for the family

NEW Stickybear Basketbounce Stickybear Bop



Actual Reproductions

Apple II or Apple II+ with 48K and one disk drive.
3.5 DOS and Apple IIe or Apple III. Use with paddle or keyboard.



Optimum Resource, Inc. for Weekly Reader Family Software – in finer computer stores everywhere. Or, call toll-free 1-800-852-5000, Dept. AB-33. Only \$39.95 each.

Weekly Reader Family Software

A division of Xerox Education Publications
Middletown, CT 06457

Stickybear is a registered trademark of Optimum Resource, Inc. Apple and Apple II, II+, IIe and III are registered trademarks of Apple Computer, Inc.

teachers; types of feedback the program supplies; use of motivational devices such as graphics, sound, and competition; technical quality; instructions; and printed documentation. They point out that the reviewer must decide which criteria are most important for particular types of programs, groups of students, and classroom situations.

Three evaluation forms are given, with examples of how they can be used. These forms were developed by the Northwest Regional Laboratory in Portland, Oregon; the National Council of Teachers of Mathematics; and the California Library Media Consortium for Classroom Evaluation of Microcomputer Courseware.

Section 4 covers the details of organizing and running a courseware library.

Section 5 contains a directory of recommended courseware. The authors give a brief description of each program, with the information necessary to obtain it. They do not provide their own reviews, but give references to reviews that have appeared in magazines and other publications. Only programs that have received positive reviews are listed.

Section 6 consists of appendices containing copyright regulations; sources of evaluation guidelines, courseware reviews and courseware directories; and policies and procedures for selecting instructional materials.

The *Courseware Report Card* and *Courseware in the Classroom* are mutually complementary. The former provides detailed reviews, and the latter provides information about doing your own reviews and finding other published reviews. Both publications will help educators find the software they need to make good use of computers with their students.

Dictionaries Of Computer Terms

A great many dictionaries of computer terms are available. Some are intended for children, some for adults who are novice computer users, and some for computer science professionals.

My pet peeve about computer dictionaries is what I call "recursive definitions." These define technical terms by using other technical terms. You look up a word, and the definition contains several words that you don't know. You look up each of these in turn, but their definitions contain more words you don't know. For example, one dictionary defines *instruction* as follows:

Data which causes a computer to carry out an operation and specifies the values or *locations* of all *operands*. A *program controller* examines each instruction and initiates the specified action. An instruction usually contains an *operator* (indicating the type of command) and one or

more *address* parts, and sometimes a *tag*.

The italicized words are defined elsewhere in the dictionary. How many people who looked up the meaning of "instruction" in a computer dictionary would know the computer jargon meanings of "locations," "operands," "address," and the other terms? If you are dedicated, you might look up each of these words and then look up the technical terms used in defining them. You might keep pursuing this through several levels of definitions and then try to finally figure out the meaning of the original word in which you were interested. However, I'd prefer a trip to the bookstore in search of a new dictionary.

By the way, for those of you who are not familiar with the concept of *recursion*, a recursive procedure is one that can "call itself." Think of yourself as using a *find-the-meaning-of-a-word* procedure. One part of this procedure would tell you that if a definition contains a word you do not know, you put the original word on hold and apply your find-the-meaning procedure to the new word. That is, the procedure reapplies itself to a new word — an example of recursion. When you find the meaning of the new word, you return to trying to understand the meaning of the original one.

I have recently obtained two dictionaries that have mostly accurate and understandable definitions. Both are careful to provide clear examples and minimize the use of technical terms in definitions. For example, here are the definitions of "instruction" from the two dictionaries:

A single operation to be executed by the computer. Instructions may move data, perform arithmetic and logic functions, control I/O devices, etc. A sequence of instructions forms a program.

A single order that tells the computer to carry out some specific task. An instruction in a program might tell the computer to operate a line printer, add two numbers together, store information in memory, or to perform any one of a number of other functions. Each instruction must be retrieved from memory, decoded and executed by the computer's central processing unit. A *program* is simply a series of instructions designed to solve a problem or accomplish a task.

The first definition is from the *Illustrated Computer Dictionary*, by the editors of *Consumer Guide* (Exeter Books, 1983). This dictionary is intended for computer novices. The second definition is from *A Dictionary of Computer Words*, by Robert W. Bly (Dell Publishing Company, 1983). This one is designed for students and contains many good analogies and humorous illustrations. ☐



TO HELP EDUCATE YOUR CHILD, WE ASSEMBLED THIS DISTINGUISHED FACULTY.

It's a rare teacher who can make a child think learning's fun.

But we've found several of them. And they make Monkeymath™ more fun than your child ever dreamed an educational game could be.



Monkeymath
by Dennis Zander

Of course Monkeymath helps give your child a better understanding of addition, subtraction, multiplication and division. That's the part you'll like.

But the part your *child* will like is Monkeymath's arcade-type action and animation, three skill levels and scoring. So, like any good arcade game, kids just can't stop playing it.

In fact, in a recent issue of Antic magazine, David Plotkin called Monkeymath "... one of the most entrancing educational games ever written." (And Monkeynews™ and Monkeybuilder™, our soon to be released reading comprehension and word recognition games will be every bit as entrancing.)

So Monkeymath does more than help your child understand math—it teaches him that learning can be fun.

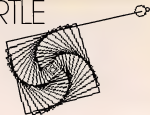
And, as you can see, you don't find teachers like that just anywhere.

Monkeymath™, Monkeynews™ and Monkeybuilder™—a new educational series from Artworx® for the Commodore 64, Atari, Apple and VIC-20 computers. Cassette/Diskette from \$23.95. Artworx Software Co., Inc., 150 North Main St., Fairport, N.Y. 14450. For a free catalog of Artworx Software write or call 800-828-6573.



Artworx®
So you can play.

FRIENDS OF THE TURTLE



David D. Thornburg, Associate Editor

Bucky And The Turtle: Exploring The Geometry Of Thinking

The philosopher, mathematician, inventor, and citizen of the whole earth – R. Buckminster Fuller – died this past July at the age of 86. Bucky influenced many people through his mathematical discoveries, and delighted millions more through his designs resulting from these discoveries. The geodesic dome stands as the most easily recognized of his creations.

While we can appreciate the results of his thought, it is especially valuable for readers of this column to acquaint themselves with his "geometry of thinking" – a philosophy called "Synergetics."

Synergetics is a mathematical formalism that, according to Fuller, embodies the design principles of the physical universe. His exposition of these principles formed the subject of two books, *Synergetics* and *Synergetics 2* (Macmillan, 1975 and 1979, respectively). While many people marvel at the beautiful simplicity of the geodesic dome or of the tensegrity structures Fuller discovered, few have taken the time to understand the underlying mathematical principles that led to the creation of these structures.

It so happens that the principles of Fuller's geometry are easily grasped once one realizes that Synergetics is identical to the mathematical formalism of turtle geometry.

Process Descriptions

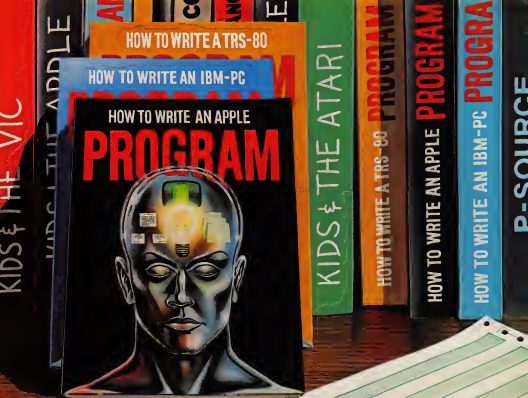
In turtle geometry one deals with process descriptions rather than with static descriptions of geometric figures. The two operators (FORWARD and RIGHT) change the state of the turtle and can be used to move it anywhere on a surface. As a

result, any static figure can be equivalently described by the process that created it. Process-based descriptions are central to Synergetics as well.

While it is impossible to do justice to the formalism of Synergetics in the short space of this article, several key concepts (and their equivalent expressions in turtle geometry) will be described. Each concept will be presented first from the perspective of Synergetics and then from the perspective of turtle geometry.

1. *There is no continuum.* There are no solid surfaces in the universe, no flat or smooth areas. Wherever scientists have looked, they have only uncovered localized energy fields which we perceive as discrete countable atoms. These atoms establish spatial relationships with other atoms through mutual optimization of their energy fields. The idea that the universe is composed of countable parts, that it is somehow granular, has an interesting expression in turtle geometry. Since the turtle responds to one command at a time, either it can move or it can turn. The fact that the turtle cannot turn while moving means that, in common with Synergetics, turtle geometry does not allow continuous curved surfaces.

2. *Measurements in geometry need only two parameters – frequency and angle.* These two parameters are sufficient to describe the location and placement of the nodes associated with the discrete quantized atoms which comprise the matter of our physical universe. The process by which one can move between any two nodes in the universe is capable of being expressed in terms of a combination of linear movements along nodes



3 exceptional books join the DATAMOST library.

INTRODUCING... HOW TO WRITE A PROGRAM

Here is a series of easy to read, easy to use, easy to understand books, which teach you how to write usable, useful programs on your computer. And you don't have to worry about irrelevant material which has no interest for you, because there are three specific volumes: One for the Apple,* one for the IBM-PC,* and one for the TRS-80.†

In each of these books author Ed Faulk leads you through your favorite computer and takes the mystery out of writing programs for it. As you proceed, interesting chapter by interesting chapter, you'll

wonder why you were ever intimidated by the thought of programming!

If you want to get the very most out of your Apple, IBM-PC or TRS-80 then you really want **HOW TO WRITE A PROGRAM**. Before you're past Chapter 2 you'll be programming. By the end of the book you'll be willing to tackle business programs, personal use programs and even games and adventures! **\$14.95**

Get your copy now. Available at computer and book stores, or:

DATAMOST (213) 769-1202
9748 Cozycroft Ave., Chatsworth, CA 91311

Reston Publishing Company, Inc.
A Prentice-Hall Company
Reston, Virginia
Toll free (800) 336-0336

*Apple is a trademark of Apple Computer, Inc. IBM-PC is a trademark of IBM Corp. TRS-80 is a trademark of Tandy Corp.
VISA/MASTERCHARGE accepted. \$2.00 shipping/handling charge. (California residents add 9% sales tax.)

and angular reorientations.

In turtle geometry, this central concept is expressed by the fact that combinations of the commands FORWARD and RIGHT are capable of repositioning the turtle to any desired location. Fuller's use of frequency instead of distance is a result of his desire to remove absolute scale from his geometry.

3. *There is no simultaneity.* The physical universe is an unfolding scenario of nonsimultaneous (but partially overlapping) energy events. The finite speed of light governs our perception of the physical universe. A pair of events that appear to be simultaneous to one observer will appear to be nonsimultaneous to a second observer at another location. Since nothing happens "all at once," then all events and structures are the result of a process which created them. Traces of completed events resulting from separate and distinct processes may appear similar to each other.

Simple Is Powerful

A problem with static descriptions of systems is that they do not preserve the details of the processes which created them. Since the process contains more information than the static trace of its result, a process description is inherently more fundamental. Furthermore, process descriptions are often more compact than static descriptions. This surprising result lends force to the idea that simpler descriptions are more powerful.

Turtle geometry defines objects through the description of the processes that create them. Computer-based implementations of turtle geometry allow the explicit creation of procedures that describe the steps needed to create various geometrical shapes. These procedures can often be treated as extensions of the computer language itself. Logo is a prime example of a language that does this.

There are many advantages of process-based descriptions. In conventional coordinate geometry, for example, the static description of a square located on a grid consists of specifying the coordinates of the square's corners.



To create a new square at another location, one must create a new set of coordinates for each corner. In turtle geometry, once one has defined a procedure which creates a square, additional squares can be created by moving the turtle to a new location and using the "square" procedure at that point.



4. *No two events can occupy the same space at the same time.* Two energy events that are in close temporal and physical proximity will interact with each other in one of several ways, including:



a. *tangential avoidance.* One event can cross over or under another event.



b. *modulated noninterference.* If the energy events consist of a train of pulses and spaces, their paths can cross in a fashion similar to that displayed by two rows of cars which are changing lanes on a freeway.



c. *reflection.* Two events can reflect from each other and acquire new paths.



NOW, PLATO COURSEWARE MAKES ALGEBRA FRIENDLY.

Algebra can be a fascinating learning experience with the help of PLATO® educational courseware.

PLATO helps bring out the best in your child...and the best in your Apple II Plus or Apple IIe.

A new series of PLATO lessons can help your kids feel comfortable and confident about Algebra. Practice problems change at random to challenge them; examples of solutions guide them; performance reports encourage them. If a mistake is made, PLATO shows kids the correct answer or how to correct it. So before they know it, they're

into Roots, Polynomials, Factoring, Equations and much more.

These Elementary Algebra lessons join the growing PLATO library of quality educational



courseware for microcomputers. Other lessons include Math, Foreign Languages, Physics-Elementary Mechanics, Computer Concepts, Computer Literacy and Keyboarding.

See the PLATO line at selected retail outlets. All PLATO micro courseware is available for the Apple II Plus and Apple IIe. Some lessons are also available for the TI99/4A and Atari 800.

For a free PLATO catalog:
Call toll-free: 800-233-3784.
(In Calif., call 800-233-3785.)
Or write Control Data Publishing Co., P.O. Box 261127,
San Diego, CA, 92126.

*Warranty available free from Control Data Publishing Co.,
4455 La Jolla Village Mall, San Diego, CA 92122

PLATO
COMPUTER-BASED EDUCATION

GD
CONTROL DATA
PUBLISHING



d. *refraction*. Two events can, on achieving close proximity, perturb each other's path to avoid a collision.



e. *collision*. When two energy events come into sufficiently close proximity, they may collide and smash into several other energy events which go off in a multitude of new paths.



f. *attainment of critical proximity*. When two energy events become sufficiently close, they may go into orbit around each other. As a result of this coupling, they form a new system.

There are six ways in which two energy events can interact. There is *no* way two energy events can occupy the same place at the same time. The concept of a dimensionless point resulting from the intersection of two lines is thus meaningless in the physical universe.

In turtle geometry a secondary consequence of this concept is that different procedures can be used to create figures which appear to be identical. A triangle, for example, can be created by following a left- or right-handed path.



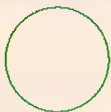
Even though the finished figures are identical (such paths are called *state change invariant*), the fact that they result from different procedures can have important consequences. For example, an assembly-line robot that moves parts between three work stations will only perform its job properly for one path description.

5. *Irrational numbers are unnecessary*. Synergetics involves a system of measurement based on discrete angles and countable frequency increments. Space-filling structures are formed from polyhedra, the minimum configuration of which is the tetrahedron. As the frequency of a structure is increased (by constructing polyhedra with greater numbers of nodes), one approaches the construction of objects that appear nearly round.

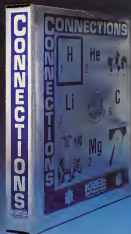


These objects are composed of a vast (but countable) number of discrete chords. Since such surfaces can be formed with any complexity desired, and since each surface is still bounded by chords, there is no need in Synergetics for irrational numbers such as pi.

This is easily demonstrated in turtle geometry. To send the turtle on a circular trip, one might instruct it to take 360 steps, turning by one degree after each step.



KRELL is EDUCATION



KRELL'S SAT* PREP SERIES

42-program series. Complete coverage of all SAT* topics including The Test of Standard Written English. All materials presented in SAT* format and at the same level of difficulty encountered in SAT* Exams. Scoring and explanations provided instantly. Krell's unique logical design customizes this multi-disk set for each individual user. *Beware of imitations!*

\$299.95

70 POINT SAT* SCORE INCREASE WARRANTY

CONNECTIONS

Krell's Connections is the most exciting development in educational computing since LOGO. Connections offers children of all ages a new world of entertainment and intellectual challenge. Parents and educators will be gratified by the intriguing yet serious nature of Connections.

Connections is accompanied by an initial set of data bases (included free with the game system) that deal with geography, chemistry, mammals, mathematics, tools, and everyday objects. Connections helps users to build their own data bases and to utilize the data bases created by others via the Connections User Group Exchange Program. 48K

\$99.95

KRELL'S LOGO

The MIT authorized version. Comprehensive 4-disk set includes two copies of LOGO for Apple II™, all utility programs and Sprite drivers, all MIT demonstration programs, shape editor, music editor, 21 program *Alice in Logoland* Tutorial Series, and massive documentation including full color wall chart. **THIS IS THE GENUINE ARTICLE!** Unlike the version marketed by Apple Corporation, KRELL'S LOGO offers the full package of M.I.T. features including the ability to save pictures.

Spectacular Price \$89.95

**TOP RATED IN INFOWORLD
EXCELLENT IN ALL
CATEGORIES!**

New! ALEXANDER THE GREAT

Available at last! *Alexander The Great* is the ultimate game for developing word and arithmetic skills, far better than *Scrabble™*. *Alexander The Great* permits equal competition between players at different skill levels. Complete graphics and range of options make *Alexander The Great* the best and most challenging, educational tool ever devised. Available for all microcomputers and in a board version. 48K.

\$39.95



New! PLATO'S CAVE

Spectacular game for aspiring scientists of all ages. Players probe Plato's Cave with light beams as they explore the relation between illusion and reality and the relation between evidence and inference. Graphic, dynamic, and challenging, with difficulty levels suitable for all. 48K.

\$49.95

Available at Selected Dealers

ALSO AVAILABLE FROM KRELL: Botticelli, Galileo, Isaac Newton • F.G. Newton, Pythagoras and The Dragon, The Language of Meth, Linear Equations, Descartes' Delight, Odyssey in Time, War of the Samurei, The Bleck Deeth, Electrol College and Primary Fight, Adventures in Flesh, Competency/Proficiency Skills, Gelectic Magellan, Shelby Lyman Chess Tutorial Series. **CALL OR WRITE FOR A COMPLETE CATALOG**



NY Residents add sales tax
Outside N.Y. add
\$3.00 shipping
Phone orders subject to credit check

**DEALER INQUIRIES
INVITED**

KRELL

SOFTWARE CORP.

The state of the art in educational computing

1320 Stony Brook Road, Stony Brook, New York 11790
Telephone (516) 751-5139

Apple, Apple II, and Apple II Plus are registered trademarks of Apple Computer, Inc. in the U.S. and other countries. Microsoft, MS-DOS, and Windows are registered trademarks of Microsoft Corporation. IBM and PC are registered trademarks of International Business Machines Corporation. Commodore and Commodore 64 are registered trademarks of Commodore International, Inc. Atari and Atari 2600 are registered trademarks of Atari Inc. All other trademarks are the property of their respective owners.



APPLE, ATARI, COMMODORE, IBM-PC, RADIO SHACK

Trademarks of Apple Comp. Corp. Atari Corp. Commodore Corp. IBM Tandy Corp.

Circular paths with different sizes can be created by changing the size of the step or by changing the amount turned at the end of each step. Instead of dealing with the concepts of diameter and area, turtle geometry creates circles through the concepts of perimeter and curvature.



6. Meaningful descriptions of processes are local.

Every celestial object is in motion with respect to every other object. These motions, viewed as a set, are nonsimultaneous.

Furthermore, the interactions of these various motions vary widely over the eons of time. As a result, any meaningful system of geometry must describe local processes without reference to an absolute origin. A description of a triangle must describe only the triangle itself and not be depend-

ent on the reference frame in which the triangle is being envisioned.

The concept of local descriptions of geometrical figures is central to turtle geometry. In contrast to conventional coordinate geometry, turtle procedures provide *intrinsic* descriptions of objects. As mentioned before, a coordinate representation of a square applies to that one square only. The points on this one square are fixed in relationship to the origin of the coordinate system. In turtle geometry, on the other hand, a square is defined by the local steps that are needed to create it. A procedure such as:

```
TO SQUARE
  REPEAT 4 [FORWARD 25 RIGHT 90]
END
```

will always create a square path regardless of the turtle's location and orientation.

If, as Fuller believed, Synergetics provides the proper geometric framework with which to view the universe, then the incorporation of turtle geometry in various popular and user-friendly computer languages promises to help expand the awareness and creativity of all its users. The fact that many of the users of turtle geometry are children suggests that the child's view of the physical universe might have more power than we ever expected. ©

**VIC 20™
COMMODORE 64™**

JOIN THE COMPUTER REVOLUTION WITH A MASTERY OF THE KEYBOARD!

In the age of the computer, everyone from the school child to the Chairman of the Board should be at home at the computer keyboard. Soon there will be a computer terminal on every desk and in every home. Learn how to use it right ...and have some fun at the same time!

Rated THE BEST educational program for the VIC 20™ by Creative Computing Magazine

TYPING TUTOR PLUS WORD INVADERS

The proven way to learn touch typing.

**COMMODORE 64 Tape \$21.95 COMMODORE 64 Disk \$24.95
VIC 20 (unexpanded) Tape \$21.95**

Typing Tutor plus Word Invaders makes learning the keyboard easy and fun! Typing Tutor teaches the keyboard in easy steps. Word Invaders makes typing practice an entertaining game. Highly praised by customers:

"Typing Tutor is great!", "Fantastic", "Excellent", "High quality", "Our children (ages 7-15) literally wait in line to use it!", "Even my little sister likes it!", "Word Invaders is sensational!"

Customer comment says it all...

"...it was everything you advertised it would be. In three weeks, my 13 year old son, who had never typed before, was typing 35 w.p.m. I had improved my typing speed 15 w.p.m. and my husband was able to keep up with his college typing class by practicing at home."



NEW!
**IFR
(FLIGHT
SIMULATOR)
CARTRIDGE
FOR THE VIC 20
\$39.95
JOYSTICK REQUIRED**



Put yourself in the pilot's seat! A very challenging realistic simulation of instrument flying in a light plane. Take off, navigate over difficult terrain, and land at one of the 4 airports. Artificial horizon, ILS, and other working instruments on screen. Full aircraft features. Realistic aircraft performance—stalls/spins, etc. Transport yourself to a real-time adventure in the sky. Flight tested by professional pilots and judged "terrific!"

USA Shipping and handling \$1.00 per order. CA residents add 6% tax.

**ACADEMY
SOFTWARE**

P.O. Box 9403, San Rafael, CA 94912 (415) 499-0650

Programmers: Write to our New Program Manager concerning any exceptional VIC 20™ or Commodore 64™ game or other program you have developed.

SOFTWARE MOVIES™



new!

SOFTWARE DESIGNS FOR DEVELOPING YOUNG MINDS™

MAXIMUS, Inc. is excited to present two new educational software movies for kids of all ages . . . and more are on the way!

STORYLINE™ makes bedtime, or anytime, a warm and friendly funtime. Clover the Clown is your tourguide for two fairytales: The Ugly Duckling and Rumpelstiltskin. Through computer magic you become a part of each story!

SAFETYLINE™ combines fun with important lessons about safety. Max the Cat shows you how to cross the street safely going to school and what to do when lost at the zoo.

Both software movies have interactive games that reinforce the fun and learning. Both have real human voices; you don't need a voice synthesizer!

Features of the software include:

- Sophisticated Face Animation
- Lip-Synchronized Voices
- Original Musical Scores
- Superior Full-Color Graphics
- Optional Joystick Control
- Machine Language Programs

Relax and enjoy yourself. Let Max, Clover, and their colorful friends guide you through a new world of fun and learning. You'll be amazed at how real they are!

STORYLINE™ and SAFETYLINE™ are currently available for any Atari computer with 48K. Each software movie comes in either CASSETTE ONLY (\$29.95) or CASSETTE/DISK (\$34.95) versions. Order by mail or phone. Visa and Mastercard welcome. Include \$2.50 postage and handling; Virginia residents add 4% sales tax. Dealer inquiries invited. Write for our free catalog, MAXIMUS, Inc., 6723 Whittier Avenue, McLean, Virginia 22101.

ORDER TOLL-FREE 1-800-368-2152

MAXIMUS ...Where Excellence is the Standard

© MAXIMUS, Inc. 1993 Atari is a registered trademark of Atari, Inc.

Adventureline™
Series Coming
Soon

Atari Key Panic

John Fackrell

This rapid-fire game tests your speed and hand-eye coordination. You must defend your home base against the increasingly fast character "bombs." Three skill levels, as well as final score and rank, are included.

"Key Panic" is a multilevel, fast-action game in which you must shoot descending characters that threaten your protective shields at the bottom of the screen.

Written on an Atari 800, the program has been condensed so it can run on an 8K Atari. It was originally designed to improve typing speed and key recognition (which it does), but it also turned out to be enjoyable as a game, too, with lots of player options.

Choose Your Bombs

After typing in the program, be sure to SAVE it. When you run Key Panic, you will be given several options.

First, use the SELECT key to choose one of three skill levels. You will probably have to play the game a few times to find the best level for you. Next, use the OPTION key to choose letters, numbers, or letters and numbers. This will determine what kind of "bombs" you'll have to contend with.

Now you're ready to play. Press START and the panic begins. As each character scrolls down, you must identify it and quickly press the corresponding key.

At the bottom of the screen, you'll have three protective shields. If you miss the right key or hesitate, the character bomb will strike and destroy your shield with a loud explosion. If you lose all three shields, the game ends and you will receive a score and rank.

If you're able to fend off all the characters in the first wave (approximately 50), there will be a

short pause before the speedier second wave begins. There is a total of five waves, each progressively faster. Make it through all five waves and you win. You'll then receive a score and rank. Press START for another game.

Atari Key Panic

```
10 GOTO 510
20 ON OPT GOTO 30,40,50
30 CHR(Z0)=65+INT(RND(Z0)*26):RETURN
40 CHR(Z0)=48+INT(RND(Z0)*10):RETURN
50 CHR=INT(RND(Z0)+0.5):IF CHR=Z1 TH
EN GOTO 30
60 GOTO 40
70 POSITION X,Y:? #Z6:CHAR#:RETURN
80 POSITION X,Y:? #Z6:CHR:RETURN
90 GOSUB 20:FOR Y=Z6 TO Z1 STEP -Z1:
CHR(Y)=CHR(Y-Z1):POSITION Z9,Y:?
#Z6:CHR#:CHR(Y):NEXT Y
100 POKE 540,103-(SEL*25)-(WAVE*Z5):
SOUND Z0,255-(COUNT*30),Z2,Z4+CO
UNT
110 IF PEEK(540)=Z0 THEN Z30
120 IF PEEK(764)=255 THEN 110
130 GET #Z1,KCHR:IF KCHR<>CHR(COUNT)
THEN 110
140 POSITION Z9,COUNT:? #Z6:" ":CHR(
COUNT)=32:SCR=SCR+(CINW*SEL):POS
ITION Z1,Z3:? #Z6:SCR:CINW=CINW+
Z1
150 IF CINW<>50 THEN 190
160 SOUND Z0,Z0,Z0,Z0:X=Z9:FOR Y=Z1
TO Z6:CHAR#=" ":GOSUB 70:NEXT Y
170 WAVE=WAVE+Z1:IF WAVE=Z6 THEN 320
180 GOTO 760
190 IF PEEK(540)<>Z0 THEN 210
200 GOTO 90
210 IF COUNT<>Z1 THEN COUNT=COUNT-Z1
:GOTO 110
220 GOTO 190
230 IF COUNT<>Z6 THEN COUNT=COUNT+Z1
:GOTO 90
240 SOUND Z0,Z0,Z0,Z0:X=Z9:FOR Y=Z1
TO Z6:CHAR#=" ":GOSUB 70:NEXT Y
250 COL=48:FOR X=Z1 TO 200 STEP 10:P
OKE 712,COL:POKE 710,COL:FOR Y=Z
1 TO Z2:SOUND Z0,X+Y,8,15:COL=IN
T(RND(Z0)+0.5)
```

SCOTT, FORESMAN PROBE

EASY AS PIE!

IT'S BASIC

Unlock the full potential of your computer, and satisfy your family's learning appetite.

PROBE makes beginning Basic Programming as easy as pie.

Scott, Foresman's approach blends hands-on training with self-instructional activities. From the first minute, PROBE's easy to follow format shows you how to turn your computer into a productive working tool. Learn simple exercises like "Teaching the Computer to COUNT." Discover how to DEBUG. Create exciting graphics, sounds, and animation.

There's even a Helper's Manual with answers to all the questions.

PROBE is available for four different age levels, ranging from five years to adult. There's nothing else on the market like PROBE.

SCOTT, FORESMAN...

Products with tomorrow in mind.

THERE'S MORE TO PROBE THAN MEETS THE EYE.

Workbook, Helper's Manual, a wall chart of computer commands, 22" x 16" keyboard wall chart, 30-sheet pad of screen grids, and Diskette. Available for six popular personal computers.

Buy PROBE wherever quality software is sold or write:



**Scott, Foresman
and Company**

Electronic Publishing Division

1900 East Lake Avenue Glenview, Illinois 60025

VIC Typo Invaders

Kent S. Brewster

This game, similar in concept to "Atari Key Panic," was written for the unexpanded VIC. It not only plays fast, but also improves typing skills.

The Protection Of QWERT

Your mission in "Typo Invaders" is to protect the city of QWERT from the fatal alphabet bombs. As each letter drops, press the appropriate key before the bombs explode in the city.

With each pass, the bombs drop from an increasingly lower altitude. At the start of the game, you must choose a difficulty level (0 to 9). Points are awarded according to this level as well as the distance from the city when a bomb is destroyed. The game ends when QWERT is destroyed.

The program uses approximately 2700 bytes, which, of course, works fine with an unexpanded VIC. However, if your VIC has 8K or more expansion, change line 100 to:

```
100 SC=4095:CC=37887
```

Repeated exposure to Typo Invaders may have certain positive educational effects, such as a drastic increase in typing speed. My top score is 3641, but I expect that to be beaten handily by any competent touch-typist.

If you'd rather not type in this VIC program, send \$3, a blank tape, and a SASÉ to:

Kent S. Brewster
1152 Snowberry Ct.
Sunnyvale, CA 94087

VIC Typo Invaders

```
1 REM *****
2 REM *{3 SPACES}TYPO{2 SPACES}INVADERS
  {3 SPACES}*
3 REM *****
4 :
5 REM *** STARTUP ***
6 PRINT "{CLR}":POKE36879,25:PRINT"NEED I
  NSTRUCTIONS(Y/N)"
7 GETA$:IFA$="Y"THEN20
8 IFA$="Y"THENS30
9 IFA$="N"THENS0
10 GOTO20
11 PRINT "{CLR}":PRINT"ENTER DIFFICULTY LE
  VEL{10 SPACES}0-9"
12 PRINT"(0=HARDEST, 9=EASIEST)"
13 GETDI$:IPDI$=" "THENS0
14 :
15 REM *** INITIALIZE VARIABLES ***
```

```
90 D=VAL(DI$):CP=495:DL=21:CS=486:CE=506:
  S1=36876:V=36878:WN=36877:S=0
91 :
92 REM *** MEMORY-DEPENDENT VARIABLES ***
93 SC=7679:CC=38399
94 :
95 REM *** SET UP SCREEN ***
96 POKEV,15:PRINT "{CLR}"
97 GOTO330
98 :
99 REM *** PICK A RANDOM LETTER ***
100 NL=CS-(DL*22)-1:OL=NL
101 R=INT(RND(0)*25+2)
102 OL=OL+1:NL=OL:IFNL=CE-(DL*22)THEN380
103 :
104 REM *** MAIN LOOP ***
105 POKESC+NL,R:POKECC+NL,6:POKES1,255-NL
  /22
106 FORI=1TOD*5+1:NEXT
107 POKESC+NL,32:POKECC+NL,1
108 NL=NL+22
109 IFNL>484THEN340
110 GOTO230
111 GOTO160
112 :
113 REM *** GET PLAYER'S KEY ***
114 GETA$:IFAS$=" "THEN220
115 IFCHR$(R+64)=AS$THEN260
116 GOTO160
117 :
118 REM *** EXPLODE LETTER ***
119 POKESC+NL,R+128:POKECC+NL,1
120 POKES1,0:POKEWN,255
121 FORX=15TOSTEP-1:POKECC+NL,2
122 POKES1,255-X:FORI=1TO25:NEXTI:POKECC+
  NL,1:FORI=1TO25:NEXTI:NEXTX
123 POKES1,0:POKEV,15:POKESC+NL,32
124 :
125 S=S+10-D+(22-INT(NL/22))+22-DL:GOSUB4
  40
126 :
127 GOTO140
128 REM *** SET UP CITY ***
129 FORI=CSTOCE-1:POKESC+I,127:POKECC+I,6
  :NEXT:GOTO130
130 :
131 REM *** EXPLODE CITY BLOCK ***
132 POKES1,0:POKESC+NL,255:POKECC+NL,5:PO
  RX=18TO1STEP-1
133 POKES1,180+X*5:POKESC+NL,127:POKECC+N
  L,4:FORI=1TO50:NEXT:POKESC+NL,255:POK
  ECC+NL,3
134 FORI=1TO50:NEXTI:NEXTX:POKESC+NL,32:P
  OKEWN,0
135 GOTO140
136 :
137 REM *** END THIS PASS, SET UP NEXT PA
  SS ***
138 NH=0:FORI=CSTOCE:P=PEEK(SC+I):IFP=32T
  HEN400
139 NH=NH+1:IFI=CETHEN410
140 NEXTI
141 IFNH=0THEN400
142 DL=DL-1:IFDL=3THENDL=4
143 N=INT((NH/2):CS=CP-N+1:CE=CS+NH:PRINT"
  {CLR}":GOSUB440:GOTO330
144 :
145 REM *** PRINT SCORE ***
146 PRINT "{BLK}{HOME}:"
147 SS=STR$(S):LS=INT(LEN(SS)/2)
148 FORI=1TO10-LS:PRINT "{RIGHT}";NEXT
```

***It's still around if
you know where
to look.***

We are Kangaroo™ Inc.,
dedicated to just plain fun for
kids 3 to 8 years old.

Jeepers Creatures™ - 30 basic
animals with interchangeable
heads, torsos, and legs or tails.
Create an owligator or an octo-
catfish or one of over 26,000
funny colorful combinations in
this goofy collection of mixed
up animals.

My House-My Home™ - Let's
move into the house on Some-
where Street. It's ready for fur-
nishing and family. Oops, you
put the kitchen sink in the
bedroom and Aunt Nellie's bed
in the kitchen. That's silly.

Jeepers Creatures and My
House-My Home have no win-
ners or losers, no right or wrong



answers, no high scores to beat,
just hundreds of hours of crea-
tive play.

Give your child's imagination
a boost with Kangaroo games
designed for Apple and Atari
computers.

Jeepers Creatures and My House-My
Home are each available for \$34.95
at your software dealer or from
Kangaroo, Inc., 332 South Michigan
Ave. Suite 700, Chicago, IL 60604, (312)
987-9050. Visa, MasterCard and personal
checks accepted.



KANGAROO™

For a pocket full of fun.

© 1983 Kangaroo Inc.

**What ever happened
to just plain fun?**

```

470 PRINT$:RETURN
478 :
479 REM *** END GAME ***
480 PRINT"WANNA PLAY AGAIN?(Y/N)"
490 GETA$:IFA$=""THEN490
500 IFA$="Y"THEN10
510 IFA$="N"THENPRINT"BYE!":END
520 GOTO490
528 :
529 REM *** INSTRUCTIONS ***
530 POKE36865,130:PRINT"[BLK]{5 SPACES}TY
PO INVADERS"
540 PRINT:PRINT"[RED]TYPOGRAPHICAL ERRORS
ARE FALLING FROM ANOTHER GALAXY."
550 PRINT:PRINT"[BLU]DESTROY AS MANY AS
{SPACE}POSSIBLE BY HITTING THE PROPER
KEY."
560 PRINT:PRINT"[PUR]AS THE INVASION CONT
INUES, LETTERS WILL DROP FROM LOWER L
EVELS."
570 PRINT:PRINT"[RED]THE GAME ENDS WHEN T
HE ENTIRE CITY IS WIPED{2 SPACES}OUT.
"
580 PRINT:PRINT"[BLK]PRESS A KEY TO GO O
N"
590 FORI=130TO25STEP-1:POKE36865,I:FORX=1
TO5:NEXT:NEXT
600 GETA$:IFA$=""THEN600
610 GOTO60

```

```

260 IF COL=Z0 THEN 280
270 COL=48
280 NEXT Y:NEXT X:POKE 712,Z0:POKE 7
10,Z0:SOUND Z0,Z0,Z0,Z0
290 Y=SHY:X=Z0:CHAR$="(Z0 SPACES)":GO
SUB 70:SHY=SHY-Z1
300 IF SHY<Z6 THEN 760
310 GOTO 350
320 X=Z2:Y=Z5:CHAR$="YOU":GOSUB 70:X
=14:Y=Z5:CHAR$="WIN!":GOSUB 70
330 FOR X=Z1 TO 25:FOR Y=Z1 TO 20:NE
XT Y:PT=50+INT(RND(Z0)*100):COL=
Z6+16*INT(RND(Z0)*16)
340 SOUND Z0,PT,10,8:POKE 710,COL:PO
KE 712,COL:NEXT X:SOUND Z0,Z0,Z0
,Z0:POKE 710,Z0:POKE 712,Z0
350 IF SCR<HSCR THEN 380
360 X=13:Y=Z1:CHAR$="HIGH":GOSUB 70:
Y=Z2:CHAR$="SCORE":GOSUB 70
370 Y=Z3:HSCR=SCR:CHR=HSCR:GOSUB 80
380 IF SCR<4000 THEN RANK$="(300
{3 SPACES})":GOTO 440
390 IF SCR<6125 THEN RANK$="(500
{3 SPACES})":GOTO 440
400 IF SCR<12250 THEN RANK$="(1000
{3 SPACES})":GOTO 440
410 IF SCR<17000 THEN RANK$="(1500
{3 SPACES})":GOTO 440
420 IF SCR<18375 THEN RANK$="(2000
{3 SPACES})":GOTO 440
430 RANK$="(2500
{3 SPACES})":GOTO 440
440 ? "{5 SPACES}HIT{5 SPACES}:RANK:
{6 SPACES}NEW GAME"
450 ? "{5 SPACES}WAVE{6 SPACES}":RAN
K$="{5 SPACES}PUSH {5 SPACES}"
460 POKE 540,100
470 IF PEEK(540)<50 THEN X=Z1:Y=Z3:CH
AR$="{5 SPACES}":SOUND Z0,Z0,Z0,
Z0:GOSUB 70
480 IF PEEK(53279)=Z6 THEN X=Z2:Y=Z5
:CHAR$="{3 SPACES}":GOSUB 70:X=1
4:Y=Z5:CHAR$="{4 SPACES}":GOSUB
70:GOTO 600
490 IF PEEK(540)=Z0 THEN CHR=SCR:GOS
UB 80:SOUND Z0,105,12,Z4:GOTO 46
0
500 GOTO 470
510 Z0=0:Z1=1:Z2=2:Z3=3:Z4=4:Z5=5:Z6
=6:Z9=9:SEL=Z1:OPT=Z1:HSCR=Z0
520 DIM RANK$(10),CHR(8),CHAR$(20),S
EL$(10),OPT$(10)
530 OPEN #Z1,Z4,Z0,"K1":POKE 82,Z0
532 GRAPHICS 181:X=Z6:Y=Z2:CHAR$="PA
NIC":GOSUB 70:Y=Z4:CHAR$="REV.
0.0":GOSUB 70:Y=Z6:CHAR$="06/28/
82":GOSUB 70
534 FOR X=Z1 TO 750:NEXT X
540 GRAPHICS I2:POKE 700,136:POKE 70
9,202:POKE 710,Z0:POKE 711,54:PO
KE 712,Z0
545 I=PEEK(16):IF I>127 THEN I=1-128
:POKE 16,I:POKE 53774,I
550 Y=Z6:X=Z0:CHAR$="{7 TAB}
{5 SPACES}{8 TAB}:GOSUB 70
560 X=Z0:Y=Z0:CHAR$="{20 TAB}:GOSUB
70
570 X=7:FOR Y=Z1 TO Z6:CHAR$="(UP)
{3 SPACES}(LEFT)":GOSUB 70:NEXT
Y
580 X=Z1:Y=Z2:CHAR$="SCORE":GOSUB 7
0
600 SOUND Z0,Z0,Z0,Z0:FOR Y=7 TO Z9:
X=Z0:CHAR$="{20 }":GOSUB 70:NEX
T Y
610 X=Z1:Y=Z3:CHAR$="{5 SPACES}":GOS
UB 70
620 WAVE=Z1:SHY=Z9:SCR=Z0:X=Z1:Y=Z3:
CHR=SCR:GOSUB 80
630 X=53279:POKE X,8:POKE 752,Z1
640 SOUND Z0,40,Z4,Z4
650 IF SEL=Z4 THEN SEL=Z1
660 ON SEL GOSUB 2000,2010,2020
670 IF OPT=Z4 THEN OPT=Z1
680 ON OPT GOSUB 2030,2040,2050
690 ? "(CLEAR)";SEL$="{7 SPACES}
ENTER TO BEGIN"
700 FOR Y=Z1 TO 100:NEXT Y
710 IF PEEK(X)=Z6 THEN 750
720 IF PEEK(X)=Z5 THEN SEL=SEL+Z1:GO
TO 650
730 IF PEEK(X)=Z3 THEN OPT=OPT+Z1:GO
TO 670
740 GOTO 710
750 SOUND Z0,Z0,Z0,Z0
760 ? "(CLEAR)":? "{7 SPACES}ENTE
RING WAVE NUMBER: ";WAVE:GOSUB 3
000:?( "CLEAR")
770 POKE 764,255:CINW=Z1:COUNT=Z1:X=
Z9:FOR Y=Z0 TO Z6:CHR(Y)=Z3:NEXT
Y
780 GOTO 90
1000 POSITION X,Y:Y #6:CHR$(CHR):RET
URN
1200 ON OPT GOTO 1210,1220,1230
2000 SEL$="BEGINNER":RETURN
2010 SEL$="AVERAGE":RETURN
2020 SEL$="EXPERT":RETURN
2030 OPT$="LETTERS":RETURN
2040 OPT$="NUMBERS":RETURN
2050 OPT$="LETS.& NUMBS.":RETURN
3000 FOR X=1 TO 450:NEXT X:RETURN

```



COMM * DATA
COMPUTER HOUSE, INC.

SOFTWARE



**EXCITING NEW
CONCEPTS IN
EDUCATION**

- Toddler Tutor*
- Primary Math Tutor*
- Math Tutor*
- English Invaders Games*
- Sketch & Paint*

ARCADE STYLE GAMES

- Supercuda*
- Pegasus Odyssey*
- Ape Craze*
- Escape MCP*
- Maelstrom*
- Firing Line*
- Pakacuda*
- Centropods*

HOME UTILITIES

- Home Accounting†
- Stock Accounting†
- Basic Tools†
- Multi-Level Marketing Manager (Direct Selling)†
- Cash Manager†

Serving the Needs of Commodore Computers for Four Years. Call for the Dealer or Distributor Nearest to You.



COMM * DATA
COMPUTER HOUSE, INC.

320 Summit Avenue
Milford, Michigan 48042
(313) 685-0113

† Commodore 64™
/VIC 20™
*Both



Arcade Style Games are High Res Full Machine Code.
Commodore 64 and VIC 20 are Registered Trademarks of Commodore Business Machines, Inc.

Computers And Society

David D. Thornburg, Associate Editor

This two-part series on program/languages began in last month's column with a discussion of VisiCalc and Rocky's Boots. The concluding column examines the program Dancing Bear as a language and explores the potential impact of these types of languages.

That's Not A Program, That's A Language

In last month's column, I explored the idea that some software offerings that we might consider application programs are, in reality, computer languages. In order for me to conclude that a program is a language, it must have the following characteristics:

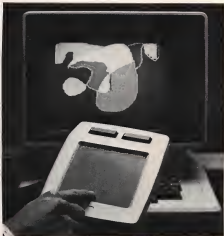
1. A computer language must allow the user to create computer-based activities that are custom-tailored to the user's needs.
2. The language must have a vocabulary and a grammar.
3. The user should be able to edit and save his or her program.
4. The user should be able to run the program.

I have read recently that some people think of word processing programs as languages. I disagree with this assessment of word processors since the word processor doesn't use the user's text to control the computer's activities. A word processor is simply a program designed to let users create text files that can be printed out. Admittedly, there are word processors that allow the creation of user-defined "macros" to perform complex formatting functions. But, while these macros are computer programs, this function is not a pivotal part of most word processing systems.

Dancing Bear As A Language

One program that is most definitely a language is *Dancing Bear* from Koala Technologies.

Koala is the manufacturer of the low-cost KoalaPad Touch Tablet which allows the simple use of a finger or stylus to convey position information to the computer.



One of the features of this device is its use of overlays that let the tablet be used both as a graphics or position input device and as a special-purpose keyboard.

Dancing Bear (currently available for the VIC) is a program which lets the user make an animated bear do a dance on the display screen. The stage on which the bear dances can be decorated with props by the user, and the bear can dance to user-defined music. This program (developed by Audio Light) uses the KoalaPad for all its input.

To see why this program is a language, we will briefly examine how it is used.

Creating A Dance Program

Dancing Bear uses the tablet overlay shown below.

ATARI SOFTWARE FOR THE WHOLE FAMILY

Here are four software packages designed for the different people in your family.

A BASIC COMPILER FOR THE PROGRAMMER

ABC (A BASIC Compiler) automatically translates Atari BASIC programs into high-performance integer P-code that runs up to 12 times faster!

Perfect for developing system software and commercial games, ABC accepts most BASIC programs (unless floating point dependent) with little or no modification. Compiled P-code is a self-standing DOS object module that is unLISTable and runs without the BASIC cartridge.

ABC allows expressions in DIM, GOTO, GOSUB, and RESTORE statements, doesn't require you to re-order lines, and fully supports string and sub-string operations.

Give your BASIC programs the look and "feel" of professional products with ABC. 40K Disk **\$69.95**. Manual alone **\$9.95** (credited toward compiler purchase).

MAKEBOOK lets you create self-booting disk or cassette versions of your ABC compiled software. Reduces overall program load time and saves memory and disk space by eliminating DOS. 40K Disk **\$14.95**.

AN EDUCATIONAL TOY FOR PRE-SCHOOLERS

Monarch is proud to present **SofToy**, an educational program smart enough to act simple.

Bells ring, balls bounce, owls hoot as SofToy and its colorful interactive display gently introduce children (two years and older) to spatial relations, letters, numbers, even elementary programming! SofToy lets kids become familiar with computers, without arbitrary demands, competition, or intimidation. SofToy grows with children, too. At more difficult levels, the match game is a real challenge for the whole family. 24K Disk **\$29.95**.

TOOLS FOR THE SERIOUS USER

PowerTools I combines four sophisticated text processing tools on one easy-to-use utility disk.

DIFF shows you differences between two ATASCII text files: for example, changes you made in a program or document from one version to the next.

Manually searching for a particular text file can take hours. But now, with **SEARCH**, you specify a search string and a list of files. **SEARCH** examines the files and points out which ones have that string. You'll never lose your Fudge Brownie recipe again!

CHANGE is a powerful search and replace utility that operates on multiple files with one command. For example, you could change character names throughout your novel with a single command, even if each chapter is a separate file.

The special pattern-matching and multiple disk capabilities of **SEARCH** and **CHANGE** are an added plus.

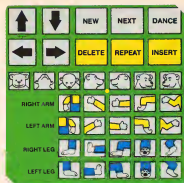
TRANSLIT lets you swap one character set for another (for example, upper case for lower case) throughout a file with one command.

PowerTools I is ideal for professional business and software development text applications. 40K Disk **\$34.95**.

Look for these fine products at your nearest ATARI dealer. Or order direct. Include \$2.00 for shipping and handling in U.S./Canada. Checks or money orders accepted. MasterCard/Visa add 3% COD higher. MA residents add 5% tax. Dealer and distributor inquiries invited. ATARI is a trademark of Atari, Inc. ABC, Makebook, PowerTools, and SofToy are trademarks of Monarch Data Systems, Inc.

MONARCH DATA SYSTEMS

MONARCH DATA SYSTEMS, INC., P.O. Box 207, Cochrasset, MA 01778 (617) 877-3457 Copyright © 1983 by Monarch Data Systems, Inc.

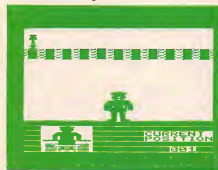


This overlay divides the tablet into three regions: bear position (upper left corner), body orientation (lower two-thirds), and program control (upper right).

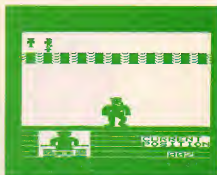
To create a new dance program, the user selects the DANCING option from the startup menu and presses NEW on the tablet overlay.



The bear is then shown in its starting position in the center of the stage.

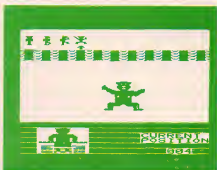
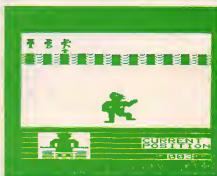


In the upper-left part of the screen you can see a small bear icon with an arrow underneath it. This is the program listing. To create the next step of the dance, we might press NEXT and turn the bear's head a little to the left and lift its left leg.



As you can see, these changes are reflected in the listing.

The next few figures show other steps in the sequence of this dance.



DYNACOMP

The Leading Distributor Of
Microcomputer Software
PRESENTS

APPLE™

ATARI™

CANON AS-100™

COMPUSTAR™

HEATH/
ZENITH Z-100™

IBM-PC™

KAYPRO II™

MORROW
DESIGN™

NEC™

NORTHSTAR™

OSBORNE™

PET/CBM™

SUPERBRAIN™

TRS-80™

CP/M DISKS
DISKETTES

HOME FINANCE

PERSONAL FINANCE SYSTEM (ALL)	\$ 39.95
TAX OPTIMIZER (ALL)	\$ 59.95
MICROCOMPUTER STOCKS (ALL)	\$ 59.95
MICROCOMPUTER BONDS (ALL)	\$ 59.95
BUDGET MODEL ANALYZER (ATARI)	\$ 23.95
PERSONAL BALANCE SHEET (OSBORNE)	\$ 29.95
STOCK MASTER/STOCK PLOT (APPLE)	\$ 59.95
NYINDEX (ATARI)	\$ 29.95
STOCKAID (ATARI)	\$ 29.95
PORTFOLIO MANAGEMENT (APPLE/OSB)	\$ 69.95
INVESTING ADVISOR (TRS)	\$ 39.95
INVESTMENT MANAGEMENT (ATARI/IBM)	\$ 49.95
OPTIONS ANALYSIS (TRS/OSB/APPLE)	\$ 99.95

BUSINESS

FINANCIAL MANAGEMENT (NORTH STAR)	\$149.95
MAIL MASTER (ATARI)	\$ 39.95
PAYFIVE (APPLE)	\$149.95
LIFE CYCLE ANALYSIS (APPLE)	\$ 39.95
DATA RETRIEVAL SYSTEM (ATARI/CPM)	\$ 29.95
OPTIMAC (TRS/APPLE)	\$ 43.95
BOOKKEEP (CPM)	\$ 69.95
CUSTOMER PROFILE (OSBORNE)	\$ 59.95

EDUCATION

HODGE PODGE (APPLE/TRS)	\$ 18.95
CHILDREN'S CARROUSEL (APPLE)	\$ 19.95
TEACHER'S AIDE (ALL)	\$ 17.95
TEACHER'S GRADE BOOK (APPLE)	\$ 49.95
PLAYER PIANO (ATARI)	\$ 19.95
SPELL IT (APPLE)	\$ 19.95
ELIZA II (ALL, except APPLE)	\$ 39.95
PROBABILITY (APPLE/ATARI)	\$ 39.95
TYPEMASTER (TRS)	\$ 18.95
FEELING BETTER (APPLE)	\$ 39.95
FROGMASER (ATARI)	\$ 21.95

DISKETTES

5 1/4" SS/SD with hub rings, packed in plastic storage box (10/box)	\$ 19.95
--	----------

PRICES ABOVE ARE FOR 5 1/4" SINGLE DENSITY. ADD \$3.00 FOR DOUBLE DENSITY, \$2.50 for 8"

CARD GAMES

BRIDGE MASTER (ALL)	\$ 29.95
GIN RUMMY (APPLE)	\$ 22.95
POKER PARTY (ALL)	\$ 23.95
BLACKJACK COACH (ALL)	\$ 33.95
EUCHRE (ATARI)	\$ 19.95

WAR GAMES

LEIPZIG 1813 (ATARI)	\$ 33.95
SHILOH 1862 (ATARI)	\$ 33.95
IRONCLADS (CPM)	\$ 29.95

ADVENTURE

CRANSTON MANOR (CPM)	\$ 19.95
WINDMERE ESTATE (NORTH STAR/APPLE)	\$ 29.95
ZODIAC CASTLE (NORTH STAR/APPLE)	\$ 29.95
STARSHIP LANDING PARTY (TRS)	\$ 19.95
GENESIS-THE CREATOR (APPLE)	\$ 49.95
VALLEY OF THE KINGS (ATARI)	\$ 29.95

GAMES

VALDEZ (ALL)	\$ 23.95
FLIGHT SIMULATOR (ALL)	\$ 23.95
BACKGAMMON 2.0 (ALL)	\$ 23.95
MANAGEMENT SIMULATOR (ALL)	\$ 29.95
CHESS MASTER (CPM/TRS)	\$ 23.95
STARBASE 3.2 (ALL)	\$ 17.95
CACTUS LEAGUE BASEBALL (ATARI)	\$ 19.95
FINAL ASSEMBLY (ATARI)	\$ 19.95

ENGINEERING/STATISTICS

DIGITAL FILTER (ALL)	\$ 53.95
HARMONIC ANALYZER (ALL)	\$ 33.95
BASIC SCIENTIFIC SUBS. Vol. 1 (ALL)	\$ 53.95
BASIC SCIENTIFIC SUBS. Vol. 2 (ALL)	\$129.95
BASIC STATISTICAL SUBS. (ALL)	\$ 99.95
CELESTIAL BASIC (APPLE)	\$ 49.95
ACTIVE CIRCUIT ANALYSIS (ALL)	\$ 43.95
BEAM DEFLECTION (ALL)	\$ 39.95
ANALYSIS OF VARIANCE (ALL)	\$ 43.95
PRINCIPAL COMPONENTS (APPLE)	\$ 49.95
STATIST (ALL)	\$ 33.95

THESE ARE ONLY A FEW OF THE HUNDREDS OF PROGRAMS IN THE DYNACOMP LIBRARY.

Besides being the leading distributor of microcomputer software, **DYNACOMP** currently distributes software in over 60 countries. **DYNACOMP** provides FRIENDLY, ACCESSIBLE CUSTOMER SERVICE through our highly qualified and knowledgeable staff. WE'RE AS NEAR AS YOUR TELEPHONE.

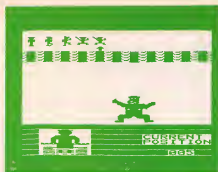
DYNACOMP'S prices are highly competitive and we promise prompt processing of every order!

WRITE FOR A FREE, DETAILED CATALOG

Daytime 24 Hour Office Hotline:
Toll Free Order Phones: Message and Order Phone:
(800) 828-6772 (800) 828-6773 (716) 442-8731 (716) 442-8960

DYNACOMP, INC.

1427 Monroe Avenue • Rochester, NY 14618



Language Adaptability

The top of the last figure shows the listing for this dance program. This listing can be edited, saved, or run. A REPEAT function allows any portion of the dance to be repeated as many times as desired.

The finished dance can be tested, edited, merged with user-defined (or predefined) music, and the stage can be outfitted with props.

The prop room lets you outfit the stage with blocks and labels. The set can be as elaborate or as simple as you desire.



The music editor uses the KoalaPad to pick up notes and place them on a staff. As with the dance itself, the music can be tested and edited if desired.

The entire dance program (props, music, and bear motions) can be saved on tape for later use.

If we accept that *Dancing Bear* is, in fact, a programming language (along with *VisiCalc* and *Rocky's Boots*), one might legitimately ask "Who cares?"

I guess the point is that languages are fundamentally more powerful than application programs because they let the user gain control over the computer system. Admittedly, *VisiCalc*,



Rocky's Boots, and *Dancing Bear* don't offer the degree of access to the computer found in languages such as PILOT and Logo, but they offer far more control than fixed-function application programs.

The personal computer is unlike any other appliance to ever grace the home. Where the washer, stove, or television has fixed functionality, the computer is, by design, a general-purpose machine. Ultimately, effective use of this machine will only come when each user feels comfortable in molding the computer's applications to his or her own needs. This molding process requires programming skills on the user's part.

Since the beginning of the personal computer industry, we have been trained to believe that computer programs were linear strings of text. In this regard, the only differences between BASIC, Pascal, and Logo are grammatical.

VisiCalc, *Rocky's Boots*, *Dancing Bear*, and other languages of this sort point to another type of language — one that is more parallel than serial in its programming style. It is significant that these three programs (and others that have similar characteristics) are designed for nonprogrammers to use.

I see the continued development of languages of this type as a revolutionary force that will finally make programming a natural activity for every user of a personal computer. ©

Use the card in
the back of this
magazine to order
your **COMPUTE! Books.**

UNICORN TREASURES MAKE LEARNING A PLEASURE



10 LITTLE ROBOTS™— Ages 3-7. The most delightful way to introduce your young learner to the computer! 10 Little Robots has five different games to keep your child's mind active. There is upper and lower case letter recognition, counting the robots, robot addition, an interactive storybook tale and a unique robot sketch game that will excite kids in a most creative way. The storybook tale introduces the concept of subtraction and serves as a motivational tool for the beginning reader.

Available for Atari 400/800/1200,
48K RAM and one disk drive.
Soon to be available for Commodore
64, IBM PC and Apple Computers.



Each Unicorn educational game teaches as it entertains. All our treasures have been developed and tested at The Computer Learning Center for Children. Written by experts who make them educational and fun, our games feature colorful, high-resolution graphics, multiple difficulty levels, beautiful music, and are completely user-friendly with simple on-screen instructions.

Unicorn's educational games are unique in their flexibility. Parents will be delighted to be able to use them year after year as their child's educational needs change. No need to spend a lot of money on software that children will master in a short time and not use again. Our superior packaging will protect our treasures for years to come.



SHIPS AHOY™— Ages 5-13. Outstanding graphics and sound makes this program an entertaining way for children to practice their basic math facts. The object of the game is to sail your ship across the ocean avoiding the treacherous mine hidden beneath the sea. Ships Ahoy allows you to select beginner, intermediate or advanced levels within the four basic math functions. The flexibility of this program lies in the option of choosing to be timed or not enabling the academically talented student to practice speed math. An equation program and built-in tables enhance the effectiveness of Ships Ahoy. Two unique and different games are included as rewards.

Available at your local computer store. If you can't find them there, you can order directly from Unicorn Software. All programs \$39.95. Please enclose \$2.00 for shipping and handling. Visa and Mastercard welcomed.

Atari, Commodore 64, IBM PC and Apple are trademarks of Atari, Inc., Commodore Electronics LTD, International Business Machines Corp and Apple Computer, Inc. respectively.
Copyright 1983 by Unicorn Software Company. All rights reserved.



FUNBUNCH™— The most flexible language program on the market today. Available on three levels, elementary (grades 1-6), intermediate (junior high school), and college board preparatory (high school). Each level includes over 2000 words and phrases. Within the elementary level the word list can be accessed by grade. The program also allows you to enter your own words and phrases. You can adjust the length of time the words and phrases are displayed on the screen, making Funbunch an excellent tool for speed reading as well as re-education. There is a built-in printer option which allows you to list the vocabulary list further review. Funbunch also contains a computer doodle drawing game for creative fun. Please specify Funbunch (elementary), Funbunch (intermediate) or Funbunch (college board preparatory) when ordering.



RACE CAR 'RITHMETIC™— Ages 5-Adult. A math game that the entire family can play together. Each person can compete on their own level in a race to the finish line. Children and adults alike will have hour upon hour of educational fun together and can practice the four basic math functions, each choosing their own operation, difficulty level and optional time factor. Race Car 'Rithmetic fully utilizes your Atari computer's superb graphics and sound capabilities. From 1 to 4 players.

DEALER INQUIRIES INVITED

UNICORN SOFTWARE™

1775 East Tropicana Avenue

Las Vegas, Nevada 89109

(702) 798-2727 or (702) 798-5990

On The Road With Fred D'Ignazio

How To Get Intimate With Your Computer

Part 2

Closer To Home

After my whirlwind travels across the United States and England, I'd like to take a break for a month and look at an important issue that is closer to home.

Elsewhere in this issue (in my "The World Inside The Computer" column) I begin a discussion about the difference between computer literacy and computer intimacy. I'd like to continue that discussion in this column.

Let's look at the myths that make adults so anxious and fearful about computers. We'll see how most adults who want to know more about computers should become intimate with computers before they try to become computer literate.

The Myth Of The Klutzy Adult

A pervasive and pernicious myth is being spread unthinkingly throughout our society. The myth is that our children are whizzes with computers, but we adults are klutzes. This myth is almost completely ungrounded in fact. Why are children so good with computers? They are good because they see only the colorful, musical, exciting side of computers. The first time they meet a computer, it is wearing a smile.

Children are spurred to master computers because they are so attractive. When we adults see this side of computers, we, too, can master computers just as fast, just as happily as our children.

Trust Your Feelings

What is computer intimacy? What is intimacy? Intimacy is a gut feeling. You know you have become intimate with your computer when you are totally comfortable and relaxed with it, when using it becomes a pleasure rather than a chore, and when you develop excuses just to spend more time with it. When you begin to think your computer is lovable, that's when you know the two of you are becoming intimate.

Getting to know a computer can be like getting to know an attractive yet intimidating member of the opposite sex. I think there is a great similarity

between my first experiences with girls and dating, and the average person's first experience with computers. When the average person first looks at computers, he or she feels the same sense of fear and anxiety that I felt when I gazed across the gymnasium floor at the girls clustered on the opposite side of the room. That was my first school dance. Computers evoke the same sense of shyness, yet they can also be tremendously attractive, even seductive.

A New Love Affair

For almost 75 years, Americans have had a love affair with their cars. Computers will soon be like cars. Like cars, they will remain machines, and our servants, yet they will also have an emotional, gut-level appeal that will turn people on and bind them to them.

The kind of car we drive depends on the kind of person we are or would like to be. Our car's appearance, model, and year often accurately reflect our values and the kind of image we want to project to our fellow human beings. Cars project all sorts of images. They can be inconspicuous, efficient, and sedate, or they can be clunky ragamuffins. They can be flamboyant, garish, and ostentatious, or they can be sensual and adventurous.

Computers, too, will soon reflect our lifestyles, values, and self-image. They will also reflect our needs. Like cars, computers will come with model names pulled from the animal kingdom. Depending on our needs, we'll buy a Cobra (fast as lightning), or a Hippopotamus (it digests huge quantities of information), the St. Bernard (it saves your life in tight situations), the Peacock (it really struts its stuff), or the Donkey (slow and stubborn, but real dependable).

Computers, like cars, can evoke a passionate attachment, a rush of affection. But to inspire real intimacy they must throb to life at the turn of a key, and they must get us where we're going - the faster the better.

A computer can be seductive and lovable, but it is not an end in itself. Many people can get excited about a computer for its own sake. Many

A New
Definition for
Ambidextrous

ENJOYSTICK

Atari Compatible

TG Products brings a new meaning to the word ambidextrous... the revolutionary, new ENJOYSTICK™ features a unique fire button module that can easily be interchanged for right or left handed play.

The ENJOYSTICK is also styled for the natural gripping action of the hand, allowing a more coordinated tracking/firing action for increased scores and less fatigue, especially during extended play. The self-centering mechanism operates smoothly with high precision control.

The ENJOYSTICK is compatible with the Atari 400/800 and 1200XL, the Atari VCS 2600 Video Game, the Sears Video Arcade, the Commodore 64 and VIC 20 and the NEC PC 6000.

Also, look for games by TG Software including such titles as NIGHTSTRIKE, DROIDS, OZZY'S ORCHARD and ABRACADABRA.

TG
PRODUCTS

TG Products, 1104 Summit Ave.,
Suite 110, Plano, Texas 75074 (214)
424-8568.

ENJOYSTICK is a registered trademark of TG Products.
Atari 400/800, 1200XL, and VCS 2600 are trademarks of Atari.
Sears Video Arcade is a trademark of Sears.
Commodore 64 and VIC 20 are trademarks of Commodore.
NEC PC 6000 is a trademark of NEC Hardware.

more, however, can get excited about using a computer to have fun, get work done, and communicate with other people.

In the future, computers will promise even more than they do today. But let's make sure they keep those promises.

More Than Tools

Computers are only machines, but they are more than tools. A hammer is a tool. So is a broom. But can you get intimate with a hammer or a broom? Not easily. Yet it's easy to get intimate with a computer, because computers are more than work-horses and tools. Computers obey our commands. They carry on conversations. They listen to us. They are infinitely patient. They can be friendly, playful, even silly.

Friendly computers? Playful computers? Silly computers? Where do you find them? Just ask a child. Children love computers because they use computers to learn and have fun. But why can't adults learn on computers, too? And why should kids have all the fun? Adults who peek over kids' shoulders at their programs find that the programs are challenging, enjoyable, and enlightening. Adults can use these programs, overcome their fears about computers, and relieve their computer anxiety. Adults can get to be just as good with computers as kids, and they can have just as much fun.

Computers That Frown And Look Mean

Most adults still think that computers are dry, cold, and unfriendly. No wonder! Most computers in the past were number crunchers, bill collectors, and tax watchdogs. Even today's computers, in their heart of hearts, do nothing more than juggle ones and zeros. But computers don't have to be technical and boring. They can be funny – if you just add people. The relationship between computers and people is often hilarious, if we keep a sense of humor. It pays to look at the lighter side of this relationship, and if we do, we find it helps to break down the barrier of fear separating us from the computer.

Coming Out Of The Closet

In recent years all sorts of groups have come out of the closet and have honestly revealed who they are and what they stand for. It's time that computer lovers do the same.

As a person who is on extremely intimate terms with his computer (it follows me into my bathroom and into my bed), I'd like to confess here and now one of the most closely guarded secrets of our relationship:

My relationship with computers is not rational.

This is a shocking revelation, but it is true.

My relationship with my computers is emotional,

quirky, and antic. It is infuriating, enlightening, and silly. It is happy, frustrating, and ecstatic. But it is rarely rational. And I contend that this is true throughout our society among the millions of computers and computer users. A rational relationship between a human being and a computer is the exception rather than the rule.

Take today. My assistant and I were working on a personal computer. We were sailing along, turning out letters, articles, and forms at a swift, productive pace. The world looked bright, and we were happy.

Then disaster struck. The computer made a mistake. The computer's mistake was only a little one. It wouldn't save any of our text files on disk so that we could print them out on the computer printer.

Until it made its mistake, the computer had been behaving itself. I felt very close to the computer and was extremely fond of it.

After the computer made its mistake, I had a change in heart. No matter what I did, the computer wouldn't save or print my files. So I hated the computer. I called it names. I threatened to walk out on it, abandon it, put it up for adoption.

Now I ask you, does this sound like a rational relationship?

A rational relationship must have at least two parties who are rational. First we look at the first partner – the human being. Occasionally, philosophers have proposed that humans are rational, but most of us know otherwise.

Next let's look at computers. This is more of a problem. Computers are incredibly complex machines, composed of millions of interacting circuits and thousands upon thousands of operating instructions, rules, and conditions. Computers are too complex to be simple, too complex to be totally rational.

Nevertheless, people think they are rational. For example, the popular wisdom now contains two catchy phrases that most people unquestioningly believe:

First: Computers don't make mistakes. Only people make mistakes.

Second: Computers do only what you tell them to.

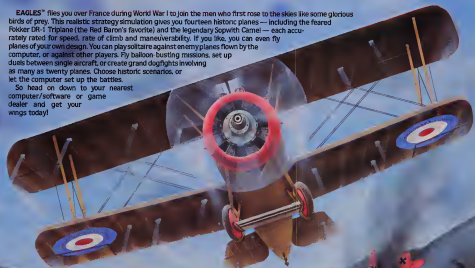
As I mentioned, I am extremely intimate with computers. Since I am in this privileged position (along with two or three million children), you would think that I would be able to see through the popular wisdom and realize that the two catchy phrases above are pure hogwash – myths and nothing more.

Alas! I am as much a victim of these myths as the next human being, at least when I am working with my assistant. Whenever anything goes wrong while she is using the computer, whenever

WHEN EAGLES FIRST RULED THE SKIES...

EAGLES™ flies you over France during World War I to join the men who first rose to the skies like some glorious birds of prey. This realistic strategy simulation gives you fourteen historic planes — including the feared Fokker DR-1 Triplane (the Red Baron's favorite) and the legendary Sopwith Camel — each accurately rated for speed, rate of climb and maneuverability. If you like, you can even fly planes of your own design. You can play solitaire against enemy planes flown by the computer, or against other players. Fly balloon-busting missions, set up duels between single aircraft, or create grand dogfights involving as many as twenty planes. Choose historic scenarios, or let the computer set up the battles.

So head on down to your nearest computer/software or game dealer and get your wings today!



FOR APPLE®, ATARI® & COMMODORE 64®

On 48K mini-floppy disk for Apple® II with
AppleSoft ROM Card, II+ & IIe & AppleIII.
On 5.25" disk for Atari® 400/800/1200
with BASIC cartridge. On 64K disk for
the Commodore 64® \$39.95.



STRATEGIC SIMULATIONS INC.

If there are no convenient stores near you, VISA & MasterCard holders can order direct by calling 800-227-1647, ext. 335 (toll free). In California, call 800-772-3545, ext. 335. To order by

mail, send your check to: Strategic Simulations Inc., 883 Sherline Road, Bldg. A-200, Mountain View, CA 94043 (California residents add 6.5% sales tax). Please specify computer format.

WRITE FOR A FREE COLOR CATALOG OF ALL OUR GAMES

APPLE, ATARI and COMMODORE 64 are the registered trademarks of Apple Computer, Inc., Atari Inc., and Commodore Electronics Ltd., respectively.

NEW WORLD'S

SOFT PRICES for SOFTWARE

APPLE & ATARI

PROGRAM	PRICE	PROGRAM	PRICE
GAMES			
A.E.	22.95	Swat Rescue	26.35
Blue Max	23.05	The Shattered Alliance	26.35
Canyon Climber	16.45	Tigers in the Snow	26.35
Capture the Flag	29.55	Wargol	26.35
Choplifter	22.55	Wing Man	22.95
Circus	22.55	Zaxxon	26.35
Cyber Masters	26.35	Zaplin	23.05
Dimension X	22.95	PERSONAL INTEREST	
Dragonsliders of Pern	26.35	Arcade Machine	39.55
Orbils	22.95	Bank St. Writer	46.15
Fathoms 40	16.45	Budget Master	26.35
Fire Ose	22.95	Cyber Graphics	22.95
Flayd at the Jungle	19.75	File Manager	50.95
Fl. Apocalypse	22.95	Graphic Generator	16.45
Gateway to Apsol	26.35	Graphic Master	22.95
Gemlight	22.95	Wicca Painter	22.95
Gesedolyn	15.40	P.M. Animator	22.95
Hellcat Ace	19.75	S.A.M. Speech	
Jumpman	26.35	Synthesizer	39.55
Jumpman Jr.	26.35	Spell Wizard	32.95
Knights of the Desert	26.35	Text Wizard	32.95
Linear Outpost	26.35	EDUCATIONAL	
Minor 2048r	32.95	Fun with Music	26.35
Operation Whirl Wind	26.35	Fun with Art	26.35
O' Riley's Mine	19.75	Grange's Magic Fountain	19.75
Pinkhead	19.75	Litfit	16.45
Pitstop	26.35	Match Bees	19.75
Poker Sam	16.45	Math Flash	14.47
Polaris	25.25	Math Wonders	18.87
Preppie	18.70	Putten Around	19.75
Preppie II	22.00	Skyride	16.45
Protector II	22.95	ACCESSORIES	
Rally Speedway	22.00	Alan 32K Expander	56.10
River Patrol	25.25	Alan 48K Expander	73.10
ROM's Revenge	26.35	Alan 64K Expander	96.80
Rosens Brigade	11.95	Direct Connect	
SAGA Games	24.75	Telephone Madam	148.50
Sands of Egypt	19.75	Generic Disks/Bulk 50 Pack	
Seawall	22.95	Single Sided	
Serpenline	22.95	Double Density	1.45
Shamos II	22.95	Single Sided	
Silicon Warrior	26.35	Single Density	1.75
Specter	22.95	Double Sided	
Springer	25.25	Double Density	2.25
Starline	22.95	Interface Module	75.63
Stone Sisyphus	24.75		
Strip Poker	22.00		



NEW WORLD

Computer

U.S.A. 800-824-9101 • OHIO 800-824-9100
VISA • MASTERCARD • AMERICAN EXPRESS

For 24 hour phone, send card filled or cashier's check, money order or direct wire transfer.
For personal checks, allow 2-3 weeks to clear. Prices reflect cash discount, not 4%
for credit card purchases. Add \$3.00 for shipping. Ohio residents add 6.5% sales tax.

the computer acts strange, whom do I blame?
Why, her, of course.

Take the other day. I was upstairs in my study and Darshi, my assistant, was downstairs in the office. All of a sudden, she yelled, "Fred! Come quick! The computer's going crazy!"

Sure enough, the cursor was rolling across the screen wiping out the words almost like Ms. Pac-Man rushing around devouring dots. I pushed every button on the keyboard, but nothing worked. The cursor was determined to eat the whole file.

Finally, in desperation, I turned off the computer. Then I turned toward Darshi. "What did you do?" I said, in a not very friendly voice. "The computer was fine just a few minutes ago. You must have done something to mess it up."

Sadly, this was the last thing Darshi needed to hear. She was already extremely timid around the computer and afraid that the next button she typed might blow the computer up. When I accused her of her worst fear, she looked ill and ran out of the office.

Why had I blamed Darshi? I blamed her because she was a beginning user and a human being. Those two facts alone were enough evidence to convict her.

Sometimes computers are agreeable, responsive, and meek. They do everything you tell them to. But then, a moment later, without any warning, they turn on you. They suffer amnesia. They pout and get sullen and write gobbledygook all over your lovely files. Or they act crazy and start doing awful things like eating up the words on your picture screen. And they get out of control. Then the only way to get their attention is to switch off their power. This, of course, is an undesirable and drastic solution. But, sometimes, it's the only way to make them come to their senses.

A Little Breathing Room

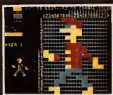
When you are in the middle of a squabble with your computer, it doesn't seem very funny. However, after things have quieted down, and you look back, you might be able to put things into perspective, and maybe even laugh about them.

But one thing you should not do is pretend that you and your computer have a rational relationship. It is anything but that. It may be quiet, sedate, and low key. Or it might be wild and boisterous. But it is not rational. It can't be. You're not rational. The computer's not rational. So how can your relationship be rational?

The sooner people stop looking at their relationship with computers as rational, the sooner they will become intimate with computers and learn to accept them for what they are. Computers are moody and complex creatures. But they try hard to please you. They really do.

COMMODORE 64™ SOFTWARE

ACCESS



SPRITEMASTER™ is not just another sprite editor. It's the finest utility available for multicolor sprite animation and game programming. It will have you making full color animated objects in just minutes. People running, birds flying or tanks rolling are a snap with Spritemaster. It will automatically append your sprites to other programs. It's easy to use and understand and comes with a full 21 page instruction manual and samples of animated sprites to get you started. (Suggested retail price., \$35.95)



GENERAL QUARTERS! BATTLE STATIONS! As chief commander of land and sea forces in the Pacific, your mission is to obtain a quick naval victory, and invade enemy territory with land forces. **BEACH-HEAD™** is a 100% machine language game and offers multi-screen action with high resolution, three dimensional graphics. (Suggested retail price., \$34.95)



NEUTRAL ZONE™ takes you to the outer edges of the galaxy. to **ALPHA IV**, a long range early warning station whose mission is to detect alien intruders from other galaxies.

NEUTRAL ZONE™ is the ultimate in high resolution, fast action, arcade quality games. It is written in 100% machine language and features smooth scrolling of the 360 degree panorama. The realism is unbelievable. (Suggested retail price., \$34.95)

SPRITEMASTER™, NEUTRAL ZONE™ AND BEACH-HEAD™
ARE AVAILABLE AT YOUR LOCAL COMMODORE DEALER
ON EITHER DISK OR TAPE.

ACCESS SOFTWARE INC

925 EAST 900 SOUTH, SALT LAKE CITY, UTAH 84105
TELEPHONE (801) 532-1134

THE BEGINNER'S PAGE

Richard Mansfield, Senior Editor

Zones Of Unpredictability

What's the most random thing you can think of? Lightning? A tossed coin? Teen love? No matter what you come up with, one thing that will not be on the list is your computer.

Few things made by man are designed to be more logical and predictable than computers. And yet computers must sometimes work with the unexpected, the irrational. If one of the uses of a computer is to imitate reality, they'll have to be able to come up with odd, random events from time to time. This is where the BASIC word RND comes in. Its job is to surprise us. We should never be able to predict how it will react.

Say you want to write a guessing game program. You want it to provide addition problems for a child to solve. There are two ways to go about it. You could construct a huge list of problems and answers, and then have the computer remember them in a massive series of DATA lines in the program. This solution has two big drawbacks: it takes a lot of time to type in the problems, and the game will ask the same questions each time it's played.

A better way would be to have the computer randomly pick the numbers for each problem. Take a look at our sample program. Line 120 establishes that we are going to ask ten questions in this quiz. Line 120 works in partnership with line 200 and means that what's enclosed between those lines will operate ten times. The NEXT word causes a counter to raise itself once each time NEXT is encountered while the program runs. So, when NEXT causes the I variable to raise up to 11, the program "falls through" to line 210 which informs the player of the score. There's nothing beyond line 210, so the program ends.

RND is at the heart of this program in lines 130 and 140: variables X and Y each receive a different random number between zero and nine. If you type ? RND (1) * 10 several times, you'll see various numbers, but all will be lower than 10. (To get numbers between zero and ten, you'd use: RND(1)*11.) Typing ? RND (1) without any multiplier will give random fractions between

zero and one. So, to get a useful integer for the purposes of our quiz, we have to multiply the fraction by ten and then round off the result by using INT().

The rest of the program is straightforward. Line 150 prints the problem, and line 160 accepts the answer from the player. Line 170 sends the computer to the "correct answer" response in line 190. If the answer is incorrect, we "fall through" to line 180 to announce the error. The score (T) is kept in line 190.

It would be easy to make this a more difficult quiz by changing the 10 in lines 130 and 140 to, say, 100 to allow larger numbers in the quiz problems. Also, it could be transformed into a test of division, multiplication, or subtraction by changing the + symbol (to / or * or -) in lines 150 and 170.

The Most Random Thing In The Room

But how "random" can something actually be, considering that it's coming out of the fiercely logical world of the computer? We won't go into heavy duty philosophy here, but there are some arguments that there isn't *any* way to generate truly random numbers. In any event, there's one aspect of RND which affects our quiz program and other games.

Inside the computer is a little engine designed to produce random numbers. It's called the random number generator and it's got to start with something. That something is called the *seed* and, in some computers, the same seed is put into the generator each time the computer is turned on. So, you will get the *same sequence* of random numbers each time you start a game after powering up your computer. We haven't solved the "same quiz each time" problem at all. Try it with our program here.

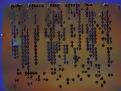
On the Atari, this isn't a problem because RND (0) results in nonrepetitive sequences. On the TI, you can use the word RANDOMIZE at the start of a program. That solves the problem. (Note too that TI BASIC uses the word RND without

NÜFEKOP passes the buck!

Since we can't decide
which of these exciting Commodore 64™ games
is more fun, we're passing the buck . . .
to YOU!

Exterminator 64

Exterminator for the 64 by Ken Grant is the "big brother" to the very popular version produced for the VIC 20™. Animation by use of Interrupt-driven sprites, exceptional use of audio capabilities and the use of approximately four times as much memory (to add more of the bugs responsible for the original Exterminator's fame) has produced a program which, from the moment it comes on screen, clearly states that the Commodore 64 has come of age. \$24.95 (available in cartridge or disk)



Widow's Revenge

This is another exceptional example of what the 64 can do. From the crawling of the web-slingers to the flapping wings of the egg-layers, author Doug Underwood has done an artist's quality job on animation. This program is similar in format to Exterminator . . . but, though of the same universe, worlds apart. Widow's Revenge is a one or two player game that you will find very hard to put away. \$24.95 (available in cartridge or disk)



To be exact, we'll pass 6.4 bucks to you when you purchase both games. Mail us the warranty cards from both Exterminator 64 and Widow's Revenge and we'll send you 6.4 dollars! We also have two exciting new programs for the VIC 20™. . .

Music Writer III by David Funtze

This is an amazingly friendly, yet powerful program designed for a broad spectrum of usage. For the entertainment-seeker a more fine, fun way to enjoy your VIC 20™ than by typing in music could scarcely be found. For the music student, the speed of input, the powerful editing, the 500-note memory capacity (three products of pure machine code programming), the clear, pleasing graphic display and the Save features make this one a must. \$16.95



King's Ransom by Scott Elder

A demon's foul curse has condemned a king (who though himself capable of striking a bargain with immortals) to an eternal half-existence in the five levels of the undead. The very gold coins the king had people put to death to possess now hold the only means of his escape. Help the reformed king collect these coins while jumping from moving level to moving level, carefully leaping over all obstacles encountered. Included is the short story, "The Thirteenth King." \$16.95



nüFEKOP

P.O. Box 156, 21255 Hwy. 62, Shady Cove, Oregon 97539 1-800-525-2529

anything in parentheses.) But on Commodore computers, you need to find a way to make the sequences of numbers different.

The solution is to introduce a random seed. On Commodore machines, you can use RND (-TI) instead of RND (I). RND (-TI) takes its seed from the computers' internal timers and results in sequences which will not repeat. How? The timers are very fast. If the seed is coming from the timers, then the exact seed will depend on when you, the human, type RUN. Since it's unlikely that you'll ever turn on the computer, LOAD the game, and type RUN in precisely the same amount of time, the timer value will be different for each game. Therefore, to randomly seed the random generator, we can rely on the most random thing in the room, you.

Math Quiz

```
100 PRINT "MATH QUIZ"
120 FOR I=1 TO 10:PRINT:PRINT "PROBLEM NUMBER" I
130 X = INT(RND(1)*10)
140 Y = INT(RND(1)*10)
150 PRINT "X:PRINT"+X;Y
160 INPUT ANSWER
170 IF ANSWER = X + Y THEN GOTO 190
180 PRINT"NO, IT WAS" X + Y: GOTO 200
190 PRINT" CORRECT!": T = T + 1
200 NEXT I
210 PRINT"YOU GOT" T "OUT OF 10 RIGHT." ☺
```



graphics

dynamic computer art is here!
express your artistic talent immediately with

VISUAL SYNTHESIZER 34.95 DISK

- menu driven
- multi-window graphics
- interactive function keys
- save visual productions on disk
- thousands of geometric variations possible
- machine language algorithm for enhanced speed

ALSO AVAILABLE

VISUAL MOODS I, II, or III 19.95 EACH DISK

five complete VISUAL SYNTHESIZER productions
with interactive function keys on each disk

utilities

BASIC HACKER'S PACK 19.95 DISK

a disk-full of Atari® Basic utilities
for your programming ease and enjoyment

- disk directory
- disassembler
- binary load
- find or list variables
- immediate DOS commands and
- block line deletion
- hex/decimal conversion

S. E. SORT 24.95 DISK

- sort strings and/or disk files
- 140 10-byte records per second
- Basic USR statement call
- input/output user exits
- enhanced tree algorithm
- machine language
- up to 10 keys—each key ascending or descending
- error handling
- sort statistics
- full documentation
- sample programs

LICENSING AVAILABLE

OUTSIDE ILLINOIS

800-621-0660

DEALER INQUIRIES INVITED CALL FOR OUR COMPLETE CATALOG

Illinois residents add 6% sales tax. Allow 3 weeks for personal checks.

\$3.00 shipping and handling

QuinTech Systems, Inc.

1271 Dundee Rd., Suite #44B, Buffalo Grove, IL 60090

®Atari is a registered trademark of Atari, Inc.

IN ILLINOIS

800-572-0440

Predict the Weather

for your Vic 20™ or Commodore 64™ Computer

This exciting, new weather package
allows you to learn, monitor, and predict
the weather using the same equipment as
the pros.

Be Your Own Weatherman

The new HAWS (Home Automatic Weather Station) combines a quality weather sensor with software to let you track weather conditions inside or outside your home. HAWS monitors weather data including dew point, temperature, humidity, and atmospheric pressure; plots historical data and graphically displays weather trends; determines the comfort and chill factors to help you dress. HAWS even forecasts the weather and compares your predictions to the local weatherman's.

HAWS uses the same sensor employed by weather services in 60 countries worldwide. The HAWS package costs only \$199.95 and includes the sensor, cassette or floppy disc program, 15-foot cable with connector for the computer, and a complete user's manual.

Send today or call toll free to order your HAWS package.



Ordering Information

Send \$199.95 in check or money order payable to Vaisala, Inc. Include name, address, telephone number, your computer model (VIC 20 or Commodore 64), and program preference (tape cassette or floppy disc).

Or call toll free to place your order.

Major credit cards accepted.

Dealer inquiries invited.

1-800-227-3800 ext. H-A-W-S

VIC 20 and Commodore 64 are trademarks of Commodore Electronics Ltd.

Learn/Teach Meteorology

More than a toy or game, HAWS provides the first opportunity to use your computer as a data sampler and data analysis system for meteorology, allowing the user to interact with incoming data to monitor and forecast weather conditions. HAWS includes an instructive software program and a complete user's manual that teaches meteorological terms and equations to allow anyone to quickly grasp weather concepts either at home or in the classroom. Simple plug-in components and easy hookup also means you can free up your computer at any time for other duties. HAWS is a great educational tool for anyone. Order today!



VAISALA

VAISALA INC.
2 TOWER OFFICE PARK
WOBBURN, MA 01801

Let your Atari experience the

MPP CONNECTION!

MPP-1150 Printer Interface

- Replaces Atari 850™ Interface Module.
- Compatible with all software (including Visicalc™, Text Wizard™, Filemanager 800™, etc.).
- 5 foot cable with Centronics plug (compatible with Epson, NEC, Prowriter, etc.).
- 2 year warranty.
- Connects to serial bus on computer.
- Supports serial printer with additional cable.
- Works on **ALL** Atari Computers.



New

**only
\$99.95**

MPP

MICROBITS PERIPHERAL PRODUCTS

MPP-1000C Modem

- No Atari 850™ Interface Module needed.
- Smart Terminal Software on Cartridge.
- Direct Connect to Phone Line.
- Connects to Joystick Port.
- Works on **ALL** Atari Computers.

Smart Terminal Features:

- Multiple Buffers
- Off-Line Editing
- Upload/Download of Text and Programs
- Full/Half Duplex
- Supports XMODEM Protocol
- ASCII/ATASCII Translation
- Allows Transfer of Files Larger than Memory
- Variable Baud Rate
- Parity Options
- 100% Machine Language

Improved



~~\$199.00~~
**new
low price
\$149.95**

MICROBITS PERIPHERAL PRODUCTS

225 W. Third Street • Albany, Oregon 97321 • (503) 967-9075

How To Get Intimate With Your Computer

Part 1

Fred D'Ignazio, Associate Editor



In my September column I proposed that we move beyond computer literacy – to computer intimacy. I have done some thinking since then, and I have concluded that we shouldn't abandon our push for computer

literacy, especially among young people. But we should encourage computer intimacy *before* computer literacy.

Computer Intimacy First

If you are intimate with your computer you are comfortable, cozy, even attached to it. You know enough to put the computer to work, but you don't have to know *how* it works. Computer intimacy is a totally new relationship between people and computers, one made possible by the new developments in computer hardware and, especially, software. Once we are intimate with our computers, many of us will also want to become computer literate. But not all of us. Nor will we need to.

Many adults envy children's relations with

computers. The myth is that children are computer whizzes, that they are computer literate. But this is untrue. Most children are no more computer literate than most adults. What they are is *computer intimate*. They like computers. They have a warm, affectionate, and playful relationship with computers. They don't fear computers. They aren't overawed. To them the computer is just a snazzy appliance or toy, a cross between the TV set, the typewriter, the piano, and building blocks.

Children move rapidly toward computer literacy because they become intimate with computers first. This is the same path adults should follow. Adult computer courses make the mistake of skipping the intimacy part and moving right into computer literacy. But, in most circumstances, this strips computers of all their fun.

The first impression the average adult has of a computer is just as he or she imagined: the computer is technical, dry, and complicated. Adults know that it is for their own good to become computer literate, but that doesn't mean they want to. No wonder the adults look enviously at the children. The children look like they are having fun. For them, learning about computers is exciting, hilarious, and very rewarding.

But why should children have all the fun? For many adults, computer literacy is a huge roadblock that separates them from learning more about computers. We should clear away this roadblock and start adults in the right direction, and introduce them to programs modeled after children's programs, programs that promote computer intimacy.

Establishing A Balance

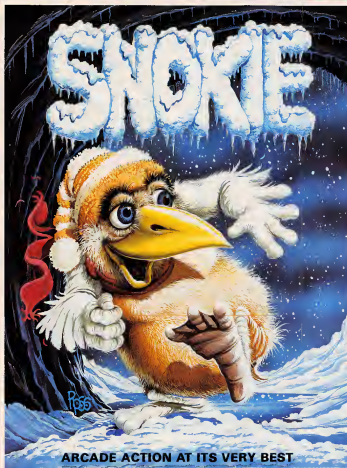
In the job market of the 1990s and the twenty-first century, very few people will be computer literate, if by literacy we mean having the ability to create real, nontrivial computer programs. Yet most

Fred D'Ignazio is a computer enthusiast and author of several books on computers for young people. His books include *Katie and the Computer* (Creative Computing), Chip Mitchell: The Case of the Stolen Computer Brains (Dutton/Lodestar), The Star Wars Question and Answer Book About Computers (Random House), and *How To Get Intimate With Your Computer* (A 10-Step Plan To Conquer Computer Anxiety) (McGraw-Hill).

As the father of two young children, Fred has become concerned with introducing the computer to children as a wonderful tool rather than as a forbidding electronic device. His column appears monthly in *COMPUTE!*.

Run! Jump! Slide Flee!
Duck! HIDE

You Won't Just Sit There . . .



ARCADE ACTION AT ITS VERY BEST

When you help SNOKIE rescue his girlfriend CARA, the action really starts! CARA, held captive by the GROOIES, needs to be rescued - now! It won't be easy. SNOKIE will face all the natural perils of the arctic including snow-boulders, glacier crevasses, moving ice-blocks and falling icicles. Also there are ice lasers and cold rays, installed by the GROOIES. Take the challenges. Go for it!

ATARI
 400/600/800/1200/1400/1450
 16K TAPE or 32K DISK
 \$34.95

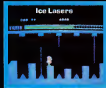
by: Y. LEMPEREUR
 Game design: A. Mersily

FUNSOFT

28611 Canwood St., Agoura, CA 91301
 (213) 991-6540

Dealer inquiries invited.

"Atari" and "Commodore" are trademarks of Atari Inc. and Commodore Inc. respectively.



Just 5 of 16 Screens

COMMODORE 64
 Tape or Disk
 \$34.95
 by: T. Lyndon

If unavailable from
 your local dealer, send
 \$34.95 plus \$2.00 shipping.

people will need to be computer intimate. They will need to be able to work with computers – confidently, comfortably, efficiently, and sometimes even joyously.

But this doesn't mean we should abandon computer literacy. Computer literacy is not just a technical skill for a few mechanics and specialists. It is a doorway that many should enter. Then they can begin using the computer to its fullest potential. For people who are computer intimate and literate, the computer can become a medium for self expression, a "new age" culture for creativity and communication, and an environment for invention.

Children, especially, should be encouraged to move beyond computer intimacy to a higher level of computer literacy (appropriate to the sophisticated software tools that will be running on computers of the future). Many will not want to go, and they shouldn't be forced. *They will not need to be computer literate to live happy, productive lives in the future. Computer intimacy will suffice.*

However, as a social goal, computer intimacy is not enough, not if our culture is to keep evolving, changing, and responding to the challenges of the present and the future.

The Magician's Top Hat

How do we see computers? Today most children

and more and more adults see computers as a magician's top hat. All the new software cartridges, disks, and tapes are stuffed inside the hat, like white doves, flaming scarves, brilliant-colored parrots, and soft, fuzzy bunnies. You can reach into the computer "hat" and pull out almost anything you can imagine – word processors, adventure games, file managers, video paintkits, turtles, and electronic pianos.

And the software industry is growing like a colony of healthy bacteria. In the future we will be able to pull a thousand times as much out of the magic hat.

But what fuels the software industry? What is its source of dynamic power and energy?

Computer literacy. Not among a handful of computer scientists and experts, but spread across millions of computers and millions of users. Computer literacy is the training ground for computer invention. And computer invention makes computer intimacy possible – at higher and higher levels.

Mass-produced microcomputers and increasingly sophisticated software tools have unleashed the imaginations and enlivened the ambitions of an army of youthful, would-be inventors. The inventors are firing off their software inventions like fish launched from a host of catapults

Unlock Your Creativity. Commodore® 64 Color Sketch Pad

Whether you're six or sixty-six, you can use high resolution graphics and color to DOODLE! Draw up a house plan, sketch a landscape, create a colorful masterpiece or just "doodle." On-line MENUS make DOODLE easy to use; 100% machine language means instant response. With your Commodore 64 and joystick or WICO® Trackball you can:

- DRAW pictures, and PAINT with 8 "brush" sizes.
- ZOOM in to draw fine detail.
- Instant BOXES and straight LINES anywhere on your screen.
- DUPLICATE, Enlarge, Stretch, Squeeze or Rotate any part of your doodle.
- Instant NEGATIVE or MIRROR IMAGE of a doodle.
- SAVE your doodle on a disk. LOAD it in to doodle some more.
- PRINT your doodle on many popular printers.

\$39.95

For information, your nearest dealer, or to order direct, CALL TOLL FREE:

1-800-558-1008

Dealer and Distributor Inquiries Invited

In Wisconsin, collect
414-291-9128

City Software

City Software Distributors, Inc.
735 W. Wisconsin Ave.
Milwaukee, WI 53233

© Copyright 1983 by Mark R. Rubin & DNNI Unlimited. Commodore 64 is a registered trademark of Commodore Electronics, Ltd.

DOODLE!
by Mark R. Rubin



Hayden has the latest and the best

Newest additions to the best-selling
I Speak BASIC series

I Speak BASIC to my Atari® I Speak BASIC to my VIC™

Ideal for schools and for the home.
(Jones) Field-tested computer literacy
courses that introduce students (and
teachers) to BASIC language program-
ming. No previous computer experi-
ence is required. Texts are machine
specific for the Atari and the VIC and
provide a complete understanding of
the machines. The Student Texts begin
each lesson with learning objectives,
followed by definitions of key terms,
programming examples, in-class exer-
cises, assignments, a summary, pro-
gramming practices, and a quiz.
All of these best-selling I Speak BASIC
titles are available:

	teacher	student
Atari®	6168	6178
VIC™	6169	6179
Apple™	6165	6175
PET®	6166	6176
TRS-80™	6164	6174
price	\$16.75	\$9.75

Atari and PET are registered trademarks of Atari
Inc., and Commodore Business Machines Inc.
respectively.
Apple TRS-80 and VIC are trademarks of Apple
Computer Inc. Radio Shack, a division of Tandy,
Corp., and Commodore Business Machines Inc.
respectively. None is affiliated with Hayden Book
Co. Inc.

VIC™ Revealed (Hampshire) In-
valuable guide for expanding assem-
bly language programming skills and
learning advanced programming
techniques. Contains full coverage on
the 6502 CPU, VIC systems software,
video interface chip, I/O ports, and
I/O processing and functions. VIC fea-
tures such as its programming power,
superior game and graphics capabil-
ity, and unique I/O capabilities are
spotlighted. #1058, \$14.95

Pascal Programs for Business
(Swan) A library of 28 essential busi-
ness programs. Includes an electronic
spreadsheet program and a word pro-
cessing program, with subroutines to
sort, merge, edit, tabulate, encode,
and print out letters and reports. Con-
tains a unique extended library of
Pascal reference functions, explaining
Pascal procedures. #6270, \$16.95

**Microcomputers Can Be Kid-
stuff** (Burke) Guides the young and
old into the world of microcomputers,
from the excitement of games to the
challenges of problem solving. The
author presents clear explanations of
hardware and software and prepares
readers to "speak" BASIC and Pilot
languages. She then covers the basic
techniques of writing programs, sav-
ing them on diskettes or cassettes,
and using commercial software. In-
cludes an easy-to-use glossary and a
checklist for using the computer.
#5202, \$11.95

VIC™ Graphics (Hampshire) A daz-
zling display of graphics contained
in 38 complete programs for the Com-
modore VIC-20 microcomputer. Appli-
cations of these displays range from
art and games to educational stimu-
lation in math, science, and business.
Advanced programs reveal techniques
of three dimensional drawing, in-
cluding adding perspective, shading,
and color. #1057, \$13.95

**Stimulating Simulations for
the VIC™** (Engel) Here is an exciting
handbook with 12 simulation pro-
grams which are unique game pro-
grams. Clearly written in VIC BASIC,
each is presented with a listing, sam-
ple run, instructions, and program
documentation. #5173, \$7.50

Secrets of Better BASIC (Mau)
Reveals the sophisticated program-
ming techniques used by professional
software authors for writing more ef-
fective and faster programs. In-
valuable advice included for testing
and debugging programs, using
memory efficiently, executing loops
and subroutines, creating disc files,
and much, much more. #6254,
\$16.95

Basic Apple™ BASIC (Coan) A
complete guide to Applesoft BASIC.
Takes you from beginning concepts,
such as entering data, obtaining out-
put, and planning programs, to more
advanced topics, such as numeric and
string arrays, and sequential and ran-
dom access files. Alternate tech-
niques for programming in Apple
Integer BASIC are also covered, as well
as low-resolution and high-resolution
graphics. #5626, \$14.95

**Using Microcomputers in Busi-
ness: A Guide for the Perplexed.
Second Edition.** (Veit) Revised and
updated. An essential briefing for any
business professional thinking of buy-
ing microcomputer systems or soft-
ware. From the basics to the fine
points of word processors, accounting
programs, disc drives, and service
contracts. Veit answers the most
often-asked questions in clear, con-
cise language. #6257, \$13.95

To order, contact your local Hayden
sales representative or call

1-800-631-0856

operator C003

In New Jersey (201) 368-2202, ext. 19



Hayden Book Company, Inc.

10 Mulholland Drive • Hasbrouck Heights, New Jersey 07604

Hayden

CHILD DEVELOPMENT SERIES

(for the 3.5K VIC and
16K ATARI)

ADD/SUB—\$16.95
Displays single or multiple digits with or w/o pictures, borrows, carries, scoring, and audio/video feedback.

NUMER-BECi—\$16.95
Number recognition, object counting, object grouping, and number/size/shape discrimination.

ALPHA-BECi—\$16.95
Twenty-six screens with letters/pictures/labels 'built' on the screen

BECi



Dealer Inquires Invited

BOSTON EDUCATIONAL COMPUTING, INC.

78 Dartmouth Street, Boston, MA 02116
(617) 536-5116 *MA res. add 5% tax

mounted on canoes rushing down a swiftly moving river.

Millions Of Computer Inventors

The personal computer is more than a magician's hat. It is also a miniature toolshed, workshop, or laboratory. And as personal computers become less isolated, and enable their users to communicate with each other, they will become a *roundtable*, a forum for people to bounce ideas off each other and then implement those ideas, jointly, as new computer software.

Computer literacy — appropriate to new, higher-level computer tools — is needed in the future, not just among a few experts but among thousands and millions of young inventors with fresh ideas and with the energy and self-confidence to turn them into computer inventions. And computer inventions will be woven into the fabric of our economy, our society, and our lives.

So computer literacy is necessary. All children should get a crack at becoming computer literate, at the youngest possible age.

Yet computer literacy still does not come first. Computer intimacy comes first, especially for the majority of adults who are scared to death of computers, yet realize that computers are the wave of the future. The strident cries for universal computer literacy only increase these adults' fears. For these adults, computer literacy is not the answer — at least not yet.

A New Religion

Computers are powerful new machines, so powerful that they are treated by many people as a new "religion." Computer enthusiasts are the evangelists for this religion, and they are winning converts by the millions.

Most adults, however, have mixed feelings about computers. They see computers for what they are. Computers are valuable tools and servants, but they are not the most important thing in life. Computers are not an end. They are merely a means to more important, human-defined ends.

Also, computers, like any other powerful and pervasive technology, are valueless in themselves. Whether their impact is good or evil depends on how they are used.

Most adults have a very healthy skepticism and distrust of computers, especially when the "true believers" market them as a necessity and tout them as a new religion.

Most adults do not need a startling plunge into the icy waters of computer literacy. First they need to get their feet wet. They need to follow in their children's footsteps. They need to play with computers, learn with computers, and have fun.

See "On The Road," page 140, for part 2 of "How To Get Intimate With Your Computer."

TIRED OF HO-HUM SOFTWARE?



ENGLISH GRAMMAR

by T. Ankofofi

Easy to use program that teaches parts of speech. Identify the part of speech of the flashing word. Suit-able for any age or grade level.

Features:

- ★ Parent/teacher specifies part(s) of speech
- ★ Parent/teacher created sentence files
- ★ Stores results on disk
- ★ Sound option

APPLE II/IIe 48K DOS 3.3
(2 disks) \$45.00

WEIGHTS & MEASURES

by G. Henszelski

Learn how to read a scale, convert between pounds and ounces, use a ruler and conversions between inches, feet, and yards. A must for every child from 4-10.

Features:

- ★ Large easy-to-read letters
- ★ Full color graphics
- ★ Sound

ATARI 400/800/1200
(cassette 16K) \$20.00
ATARI 400/800/1200
(disk 24K) \$25.00

TO ORDER

Call
1-800-354-0550
or write:

R.H.E.S.I.S.

P.O. Box 147,
Garden City, MI 48135

Please add \$3.00 shipping/handling. C.O.D. add additional \$1.50.

Write for Free Catalog.

Fast, Fast Relief From Expensive Software Blahs.

COMMODORE 64

	List Price	But For You!
SPINNAKER		
Alphabet Zoo (CT)	\$35	\$23
Cosmic Life (CT)	\$35	\$23
Delta Drawing (CT)	\$40	\$26
Delta Music (CT)	\$40	\$26
Facemaker (CT)	\$35	\$23
Fraction Fever (CT)	\$35	\$23
Kids on Keys (CT)	\$35	\$23
Kindercomp (CT)	\$30	\$19
Story Machine (CT)	\$40	\$26
Up For Grabs (CT)	\$40	\$26
CREATIVE		
Astroblitz (CT)	\$40	\$26
Trashman (CT)	\$40	\$26
Moomdust (CT)	\$40	\$26
Save New York (CT)	\$40	\$26
Pipes (CT)	\$40	\$26
Synball (CT)	\$40	\$26
HESWARE		
Attack Mutant Carnel (CT)	\$45	\$29
Coco (CT)	\$45	\$29
Maze Master (CT)	\$35	\$23
Turtle Tutor (CT)	\$40	\$26
Turtle Trainer (CT)	\$40	\$26
Paintbrush (CT)	\$30	\$19
Home Manager (D)	\$50	\$33
Time & Money Manager (D)	\$70	\$45
Heaven 64 (CT)	\$40	\$26
Grimrunner (CT)	\$40	\$26
64 Forks (CT)	\$60	\$39
Turtle Graphics II (CT)	\$60	\$40
EPYX		
Jumpman D&C	\$40	\$25
Temple of Apehah (C)	\$40	\$25
Upper Reaches Apehah (C)	\$20	\$13
Curse of Ra (C)	\$20	\$13
Starfire & Fire One (D&C)	\$40	\$25
Jumpman Junior (CT)	\$40	\$25
Lunar Outpost (D&C)	\$40	\$25
SYNAPSE		
Protector (D&C)	\$35	\$23
Shamus (D&C)	\$35	\$23
Sentinel (D&C)	\$35	\$23
Mogol (D&C)	\$35	\$23
Dreifs (D&C)	\$35	\$23
BRODERBUND		
Choplifter (CT)	\$45	\$28
Seafox (CT)	\$40	\$26
Sergejante (CT)	\$40	\$26
David Midnight Magic (D)	\$35	\$23



(C)=Tape (D)=Disk (CT)=Cartridge

**"Such-A-Deal!
Software."**

903 S. Rural Rd. #102
Tempe, AZ 85281

**TO ORDER FAST, FAST
CALL TOLL FREE:
1-800-431-8697**

For Information Only Call (602) 968-9128

PERIPHERALS AT SUPER SAVINGS

	List Price	But For You!
WICO (Atan-Commodore)		
The Boss	\$20	\$14
Bit Stick	\$30	\$19
Red Ball	\$35	\$21
Track Ball	\$50	\$30

CARDCO		
Printer Interface	\$80	\$50
3 Slot Vic Mother	\$40	\$26
6 Slot Vic Mother	\$100	\$66
5 Slot Com 64	\$70	\$45
DATA 20		
Vic Display Manager	\$100	\$79
C64 Video Pak 80	\$180	\$149
Printer Interface	\$70	\$45

ATARI SOFTWARE

	List Price	But For You!
CENTRY		
Marac Miner (D)	\$20	\$12
Sea Bandit (D&C)	\$17	\$11
Spider Quake (D&C)	\$17	\$11
Rosera Brigade (D)	\$17	\$11
BRODERBUND		
Choplifter (CT)	\$45	\$28
Arcade Machine (D)	\$60	\$39
Matchboxes (D&C)	\$30	\$19
Operation Whirlwind (D)	\$40	\$26
EPYX		
Temple of Apehah (D&C)	\$40	\$25
Gateway to Apehah (CT)	\$40	\$27
Jumpman Junior (CT)	\$40	\$27
Pitstop (CT)	\$40	\$27
INFOCOM		
Zork I, II, III Each (D)	\$40	\$25
Witness (D)	\$50	\$30
Planet Fall (D)	\$50	\$35
SPINNAKER		
Facemaker (CT)	\$35	\$23
Delta Drawing (CT)	\$40	\$26
Alphabet Zoo (CT)	\$35	\$23
Story Machine (CT)	\$40	\$26
Kindercomp (CT)	\$30	\$19

VIC 20 SOFTWARE

	List Price	But For You!
CREATIVE		
Choplifter (CT)	\$30	\$19
Astroblitz (CT)	\$30	\$19
Home Office (CT)	\$30	\$19
Home Office (D)	\$35	\$22
EPYX		
Temple of Apehah (C&D)	\$40	\$24
Sword of Fargoal (C)	\$30	\$19
Crash, Crumble	\$30	\$19
BRODERBUND		
A.E. (CT)	\$40	\$24
Seafox (CT)	\$40	\$24
Skyblazer (CT)	\$40	\$24
WIZWARE		
Electronic Party (T)	\$30	\$19
Square Pegs (T)	\$30	\$19
Turtle Tracks (T)	\$30	\$19
Your Vic 20 (T)	\$30	\$19
HESWARE		
Fort Apocalypse (CT)	\$40	\$26
Laser Zone (CT)	\$40	\$26
Necromancer (CT)	\$40	\$26
Kavendish (CT)	\$40	\$26
Facemaker (CT)	\$40	\$26
Story Machine (CT)	\$40	\$26

MONITORS

BMC 12" Green	\$100	\$79
BMC 13" Composite Color	\$399	\$259
USI 12" Amber	\$269	\$145
USI 13" Color	\$399	\$286

GRAPHICS TABLETS

Resopack Vic, C64, Atan	\$125	\$79
-------------------------	-------	------

PRINTERS

Alphacom 40 Column with Atan, Vic, C64 Cable	\$160	\$119
---	-------	-------

Ordering & Terms: Send cash check, money order or bank wire transfer. Personal/Co. checks allow 3 wks. bank clearance. VISA/MasterCard Accepted. Prices subject to change. Provide phone # with order. Shipping Software Add \$3.00, Hardware Add \$10.00. Arizona residents add 6% sales tax. Returns must have authorization # (call 602-968-9128) for authorization #1. All returned merchandise subject to restocking fee & must come with all original packaging. No returns allowed after 30 days from shipping date. Prices reflect a cash discount — credit cards add 3%.

Androbot's Topo

Michael A. Tyborski

Robots are rapidly becoming part of our life. You cannot read a magazine or newspaper without hearing about them. Although robots were once laboratory curiosities, they are now within anyone's reach.

Yes, you can own a robot. Mechanical servant? Not yet. Entertaining companion, yes.

Androbot, Inc., of Sunnyvale, California, has recently released its Topo robot. It will provide hours of entertainment for any Apple owner. Although not a true robot, it demonstrates many of the important fundamentals of robotics.

Your Computer Controls It

Topo is a radio-controlled platform that looks like a robot. It includes a user's manual, transmitter, and plug-in control card for the computer. It also includes TopoBASIC on disk, which allows it to be used within a few minutes.

An Apple computer controls Topo; this simplifies programming and reduces the selling price. It also eliminates the need to learn a new operating system or programming language. Unfortunately, your computer does not receive sensor information, a limitation that makes it possible for Topo to run into walls or down the stairs.

The robot is made of high-impact plastic and is three feet tall. Its friendly appearance attracts small children like ice cream, an effect consistent with Androbot's belief that robots

should be "friendly looking, inviting companions."

Topo has a head and arms. Unfortunately, they are not functional. The head is permanently attached to the body and does not turn, which makes the robot less lifelike. It has a decorative face grill and eyes. An emergency stop switch is mounted on top of the head which turns off the robot.

The arms, plastic flaps that can be extended as needed, are made from relatively thin plastic and cannot hold heavy loads. They attach to the body with plastic pins.

Two-Wheel Drive System

Topo has a unique drive system called Andromotion. Androbot claims that this provides "maximum stability and safety with optimum maneuverability and control." It also gives the robot an individual personality.

Just what is Andromotion? It is a two-wheel drive system that relies on angled wheels for stability. This design is patterned after the rocking chair. As a result, the robot remains stable because the effective roll center is above the center of gravity. The principle is clearer when the robot is viewed from the side. The side projection of the wheels looks like an ellipse, and the long sides resemble the rail of a rocking chair.

Because of Andromotion, Topo sways from front to back as it moves. This sway can become violent during a fast stop, making Topo look like a fishing



Androbot's Topo robot.

bobber.

Androbot states that Topo has industrial-grade batteries and a fabricated steel superstructure, and claims that high-torque motors and cast aluminum gear boxes assure structural integrity. These features place the robot above the toy category.

The robot's back panel holds the power switches, indicator lights, and a charger jack. Yes, switches. For some reason, Androbot decided to use a separate ON and OFF switch, a design possibly based on a control circuit restriction. The red and green switches may also indicate STOP and GO to children.

The indicator lights show when Topo is on and what the battery status is. When a low voltage condition occurs, a red indicator light turns on. The wheel supports also contain indicator lights for showing direction.

John Anderson's

RALLY SPEEDWAY

SLIP INTO SOMETHING TURBO-CHARGED

like the road-scorching speedster in RALLY SPEEDWAY — the game that turns your ATARI into a full-blown, four-wheeled demon! Take on our demanding course, or use the unique Construct-A-Track option to design your own. Push yourself to the limit for a better lap time, or get a friend in on the action for a one-on-one duel to the finish line — it's your choice!

CALL TOLL FREE 1-800-327-7172

**MAKE TRACKS TO
YOUR DEALER TODAY!**

ATARI 400/800/1200 CARTRIDGE
053-0171 \$49.95

If your dealer doesn't have Rally Speedway in stock, phone 1-800-327-7172 with your order or write us at Adventure International, P.O. Box 3436, Longwood, FL 32750 for your FREE catalog.
DEALER ORDERS WELCOME

COPYRIGHT 1983

 **Adventure**
INTERNATIONAL
A DIVISION OF BENTLEY ADAMS, INC.

185

You are responsible for plugging in the charger—a simple AC adapter. You must also prevent the robot from being turned on while charging. If it is, you may soon need a new charger. Finally, you must not leave the charger connected for more than 24 hours at a time.

Topo receives commands over a radio link. This link uses a 100-milliwatt, 4-channel AM transmitter that operates at 27.145 megahertz, and transmits the control card data. Although the antenna is short, a 90-foot range is possible. The transmitter has its own power switch to prevent interference when Topo is not being used.

The control card provides power and serial data for the transmitter. It plugs into slot five on the Apple computer. The unit has three integrated circuits and one regulator. This allows a 3-inch-square board to hold all the circuitry. An AMD 9513 chip generates the serial data for the transmitter.

The Documentation

The Topo manual is easy to read and understand. It comes in a small ring binder and includes dividers for future chapters. A plastic holder protects the program disk and warranty card. Interestingly, the manual was printed on a dot matrix printer, but this does not decrease its readability.

After an introduction to Androbot and Androbots, the user is shown how to unpack and check Topo. The first section also includes control card installation and battery charging instructions.

The important calibration procedure, which insures accurate movement and turning, is covered next. Finding calibration values for each surface Topo will move on will minimize errors from wheel slippage.

Finally, the last section describes TopoBASIC, and has ma-

terial for the beginning and advanced programmer. This section includes a listing of the machine language and BASIC routines. It also provides a glossary of BASIC routines.

Topo In Motion

After charging the batteries, we began to use Topo under program control. This proved to be an interesting experience. Topo just did not like repeating its path. While drawing a square, for example, it turned about 15 degrees each repetition. This made the square rotate about its center.

Proper calibration improved its performance. In our case, the procedure took about ten minutes. It had to be repeated, however, for other surfaces.

The transmitter could control Topo throughout a house. It did have some annoying dead spots, however, which made Topo act erratically or stop.

Topo cannot detect obstacles. As a result, it often ran into people or furniture. This, in turn, changed its path or completely stopped it. Whenever this happened, it had to be stopped and moved to its starting point. The program was then restarted.

Spectator reactions varied. Adults and teenagers were either amused or skeptical. Many wondered what Topo could be used for. Young children, naturally, were a captive audience. They would try touching Topo whenever it stopped. Some even talked to it.

Having already seen Heathkit's Hero robot, many people missed voice and head movement, claiming that these features make robots interesting and lifelike. A few people also wanted the arms to move. Despite these objections, they all gave Topo a favorable rating.

Future Enhancements

Androbot will offer a number of accessories for Topo, including a voice module and Androwagon.

Sirius Is GIVING AWAY Over \$35,000.00 In VIDEO GAMES!!!

You Can Win A Sirius Game OF YOUR CHOICE!

Correctly answer the questions below to qualify for the FREE GAME DRAWING.

Enter all of the
Grud Quizzes and qualify for
all 20 drawings!

GRUD QUIZ #4: TYPE ATTACK

1. In which level does the word "REFER" appear?
2. What typing speed should genetic mutants and robots choose?
3. How much energy is lost for typing a wrong letter?
4. How do you PAUSE the game?

TO ENTER:

Just send a postcard or 3 x 5 piece of paper to Sirius containing the following information:

1. Your name and address
2. The Grud Quiz number and your four answers

RULES:


1. All entries must be handwritten and individually mailed
2. All entries must be postmarked by midnight, February 28, 1984
3. Only one guess per person per quiz is permitted.

1,000 WINNERS!

If ALL of your answers are correct you will qualify for that Grud Quiz drawing 50 winners per quiz will be randomly chosen and notified by mail on or before March 31, 1984. Each winner will receive a complete Sirius catalogue listing from which they can select the game or games of their choice.

LOOK FOR MORE GRUD QUIZZES in the Oct., Nov., and Dec. issues of your favorite computer magazines or at participating software retailers.

ALL CONTESTANTS WILL RECEIVE A
FREE FULL COLOR SIRIUS COMIC
CATALOGUE

Sirius 

Sirius Software, Inc.
10364 Rockingham Drive
Sacramento, CA 95827

(VOID WHERE PROHIBITED BY LAW)

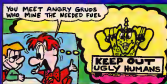
GADZOOKS! MY
FAVORITE TV GAME
SHOW IS ON...



GRUDS IN SPACE™

ALRIGHT JOHN! FOR 10 POINTS, MAKE HAROLD
"NAME THAT GAME!"

YOU'VE GIVEN AN URGENT
REQUEST TO DELIVER
FUEL TO A STRANDED
FLEET OF BATTLESHIPS



Sirius™



For more information contact
your local Sirius dealer or
contact Sirius directly at 10364
Rockingham Drive, Sacramento,
CA 95827 (916) 366-1195.

Game design by Chuck Sommerville and Joe
Dudak. Package program and audio visual ©
1983 Sirius. All rights reserved.

Sirius and Gruds in Space are trademarks of
Sirius Software, Inc. Atari 800 and 1200 are
trademarks of Atari, Inc. Commodore 64 is a
trademark of Commodore Business Machines
Inc. Apple II - and its are trademarks of Apple
Computer, Inc. IBM PC is a trade name of
International Business Machines, Inc.



Atari 800 & 1200 Disk
IBM-PC Disk
Apple II, II+ & IIe
Commodore 64 Disk



© 1983 Sirius

Richvale Telecommunications

10610 BAYVIEW (Bayview Plaza)
RICHMOND HILL, ONTARIO, CANADA L4C 3N8
(416) 884-4165

\$185.00 Canadian
\$149.00 U.S.
PLUS CUSTOMS BROKERAGE,
HANDLING AND MAILING CHARGE

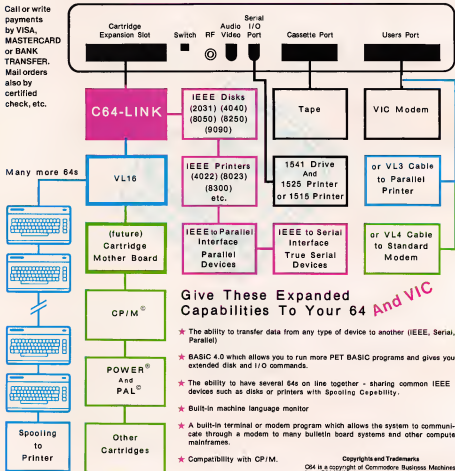
Also available
for VIC 20

C64-LINK[®] The Smart 64

RTC

RTC

Call or write
payments
by VISA,
MASTERCARD
or BANK
TRANSFER.
Mail orders
also by
certified
check, etc.



Give These Expanded Capabilities To Your 64 And VIC

- ★ The ability to transfer data from any type of device to another (IEEE, Serial, Parallel)
- ★ BASIC 4.0 which allows you to run more PET BASIC programs and gives you extended disk and I/O commands.
- ★ The ability to have several 64s on line together - sharing common IEEE devices such as disks or printers with Spooling Capability.
- ★ Built-in machine language monitor
- ★ A built-in terminal or modem program which allows the system to communicate through a modem to many bulletin board systems and other computer mainframes.
- ★ Compatibility with CP/M.

Copyrights and Trademarks

C64 is a copyright of Commodore Business Machines, Inc. C64-LINK is a copyright of Richvale Telecommunications. CP/M is a registered trademark of Digital Research. POWER is a trademark of Professional Software. PAL is a copyright of Brad Templeton.

Contact your local Commodore Dealer or RTC.

The voice module will use a tape recorder for high-quality, low-cost speech. It will be controlled by a spare transmitter channel and should help attract spectators and hold their attention.

The Androwagon compensates for the cosmetic arms. It allows Topo to carry beverages and other heavy objects. When combined with speech, this accessory could turn Topo into a party host.

Programmers should look forward to working with TopoLogo and TopoForth. These languages simplify program development and allow commands such as GO KITCHEN. They also draw the path Topo is currently following. A TEACH mode saves time by allowing command sequences to be created and saved on disk for future recall.

TopoLogo consists of extensions to Terrapin and Krell Logos for the Apple II computer, and includes calibration and demonstration programs. This package provides the most powerful way to control Topo.

Finally, interface boards will soon be available for Atari, Commodore, and Radio Shack computers. This will undoubtedly make Topo more visible. Despite its limitations, Topo provides an excellent introduction to robotics.

Topo
Androbot, Inc.
101 E. Daggett Drive
San Jose, CA 95134
\$795
\$495 without sound

to give friction-feed capability to a tractor-feed printer such as the Epson MX-80. Since friction feed can add as much as \$100 to the cost of a printer, this alternative, at less than \$5, is worth considering.

The Paper Porter is a 9½-by-17-inch sheet of clear plastic with holes punched in the side so that it can be driven by tractor pins. Near the top is a pocket formed by another sheet, which can hold by friction an ordinary piece of paper, such as letterhead. Once the top of the paper is inserted into the pocket, the Paper Porter is easily loaded and run through the printer. The procedure is repeated with each page in a multipage document. With practice, we found that the whole operation takes only a few seconds — quite comparable to the time needed to run each separate sheet through a printer with friction feed.

Print On Letterheads Or Ditto Masters

Although printing on letterhead stationery may be its primary use, the Paper Porter can come in handy in other ways. For example, we use it to make ditto masters.

A minor difficulty arises in trying to print close to the top of a page. The plastic pocket overlaps the top of the paper by one inch, making it impossible to print above that point. We solve this problem by putting two small loops of masking tape, sticky side out, in the pocket. This holds the page so that printing can start within half an inch or so of the top. After you put the tape in place, you may need to reduce the stickiness a bit. Double-stick tape works, too, but it's a trifle harder to adjust the stickiness. Once the tape is properly placed and adjusted, the fix lasts for months.

On letterhead stationery, of course, there is no need to come near the top of the page, so it can be useful to have one Paper

Porter with the tape and one without it. We've ended up acquiring two of each type, so we can be slipping one page into a Paper Porter while the other is printing — a timesaver on multipage jobs.

The 17-inch length is just enough to prevent the out-of-paper switch on the Epson MX-80 from terminating printing before the bottom of an 11-inch page. An earlier version of the Paper Porter was too short, making it impossible to print to the bottom of a page unless the switch had been defeated. With paper longer than 11 inches, and perhaps with some other printers, the alarm may still be activated. And, just as with some platen feed arrangements, the alarm may come on when pages are being changed. For these reasons, it may be desirable to defeat the switch, which is not usually difficult. On the MX-80 it can be done by taping a small piece of paper over the switch.

Business Envelopes Not Compatible

The Paper Porter does have one significant drawback: it can't print on a standard business envelope. Any paper that is even slightly wider than 8½ inches will interfere with the tractor pins.

There is at least one trick which is actually easier with the Paper Porter than with a typical friction (platen) feed printer — printing two or more columns in perfect alignment. The standard procedure is to print one column, then back up the paper and print the second column. With friction feed, the alignment is tricky, but with tractor feed, the pins guarantee that the backed-up page can be perfectly aligned with no trouble.

The Paper Porter
5718 Ponderosa Drive
Stevensville, MI 49127
(616) 429-6461
\$4.50 (\$3.50 in lots of five)

Paper Porter

Betsy and Stefan Burr

There's something particularly attractive about a simple, inexpensive device that claims to do the work of complicated hardware. That's what intrigued us about a piece of plastic called the Paper Porter, which is designed

Home Computer Games Grow Up

Orson Scott Card, Editor, COMPUTE! Books

I must admit it took me by surprise. After months of observing that almost no one was making true home computer games, suddenly I find myself with a fistful of games that are everything I could ask for.

And I do ask for a lot:

1. A home computer game should not be designed to minimize playtime – it should not be designed to take away quarters by making the game impossible to beat.

2. It should use the full power of the computer – it should do things that only the computer can do well, and it should use all the appropriate resources the computer provides.

3. It should be an excellent game, not just excellent programming – the play itself should be exciting and not serve merely as an excuse to show off the programmer's expertise.

4. Above all, the game should be designed so the player controls and, to some degree, creates the game as he plays – I have little patience with games that play *me*, forcing me to follow only one possible track or learn one mechanical skill if I hope to win.

If those requirements sound like what you want, too, I have good news for you: there are finally some software companies making a serious effort to create exactly this kind of game.

The software firm Electronic Arts has added a fifth requirement for itself: The game must be truly original. No *Donkey Kong* or *Pac-Man* clones in this group of games. Even though each of their games has roots in gaming traditions, the object has not been to recreate a favorite board game, or duplicate a sport, or translate an arcade game.

A Colony In Space

After years of spaceships blasting away at each other, Electronic Software's *M.U.L.E.* (for Atari and Commodore 64) is a refreshing change. In this game by Dan Bunten, Bill Bunten, Jim Rushing, and Alan Watson, you and three other colonists (human- or computer-controlled) have been left to mine for Smithore. However, you also have to produce enough food and energy to survive until your ship comes back in six months. To help you, you have an all-purpose robot called a M.U.L.E. – which can be as stubborn as its flesh-and-blood namesake.

This leaves you with some complex decisions to make. While you are competing with the other players, trying to make a killing in food production, Smithore, or energy, you also have to cooperate with them, so you don't overproduce one commodity and lower the price – and so you don't neglect to produce enough food and energy to keep the colony alive.

In other words, it's a game that faces the fundamental ethical dilemma of humanity, while teaching you, firsthand, the principles of economics. Sounds dead, doesn't it?

It's Serious Fun

But dead it is *not*. From the opening cartoon and the funky theme music, you know that *M.U.L.E.* is going to be fun. At the start of the game, you get to choose a creature that will be your player-figure. Your choice of creature can challenge advanced players and give a boost to beginners – and the descriptions and pictures of the creatures are fun.

Once play begins, each



In *M.U.L.E.*, from Electronic Arts, you try to get your plots to grow as much as possible.

“month” you and the other players each select a plot of land to develop. Then you take a trip into town, buy a M.U.L.E., and outfit it for the type of production you're planning. Then you get it back to your property and install it, hoping the M.U.L.E. doesn't malfunction and run away during the trip.

When the month ends, you have produced a supply of food, energy, and Smithore. All the players go to the company store to buy and sell. There you bargain until you agree on a price for your commodities. If something is in short supply, the price will probably rise; if there's a lot of it, you can only sell it at minimum. If you mined Smithore and Smithore is selling low, and you need to buy food, which is in short supply, you lose money. The player with the food, however, does rather well. After the auction is over, the computer tells you your current net worth, and you go on and add a new plot of land to your holdings.

There are other elements to play. Wampus hunting and pub crawling can use up the idle moments after your M.U.L.E. has been installed; natural disasters like acid rain, pest attacks, planetquakes, and a fire in the company store can complicate things.

In all this, you never touch anything but the joystick. Going to town and getting your M.U.L.E. outfitted is all joystick-controlled animation; natural disasters happen on

SAVE MONEY. SOLVE PROBLEMS.

Hayden Books

Apple

NEW! Data Base Management for the Apple™ (Wadsworth) #6282, \$12.95.
NEW! Pascal Programs for Business (Swan) #6270, \$15.95.

NEW! Pascal Programs for Games and Graphics (Swan) #6271, \$15.95.
Basic Apple™ BASIC (Coon) #5626, \$12.95.

The BASIC Conversions Handbook for Apple™ TRS-80™, and PET™ Users (Brain Bank) #5534, \$8.95.

I Speak BASIC to My Apple™ (Jones) teacher's manual #6165, \$17.45; student text #6173, \$8.45.

Graphics Cookbook for the Apple™ (Wadsworth) #6278, \$9.95.

6502 Software Gourmet Guide and Cookbook (Findley) #6277, \$12.95.

Atari

NEW! Atari™ in Wonderland (D'ignazio) #5771, \$9.95.

NEW! I Speak BASIC to My Atari™ (Jones) teacher's manual #6166, \$17.45; student text #6178, \$8.45.

Stimulating Simulations for the Atari™ (Engel) #5197, \$6.50.

6502 Software Gourmet Guide and Cookbook (Findley) #6277, \$12.95.

VIC

NEW! VIC™ Games (Hampshire) #1060, \$12.95.

VIC™ Graphics (Hampshire) #1057, \$12.95.

VIC™ Revealed (Hampshire) #1058, \$12.95.

I Speak BASIC to My VIC™ (Jones) teacher's manual #6169, \$17.45; student text #6179, \$8.45.

Stimulating Simulations for the VIC™ (Engel) #5173, \$6.50.

6502 Software Gourmet Guide and Cookbook (Findley) #6277, \$12.95.

IBM

COMING SOON! IBM® BASIC From the Ground Up (Simon) #6350, \$15.95.

COMING SOON! IBM® User's Guide (Held) #6262, \$19.95.

COMING SOON! IBM® Programs for Business (Stemberg) #6361, \$15.95.

COMING SOON! Business Programs for Your IBM PC (Hildebrand) #6351, \$15.95.

The 8086/8088 Primer, 2nd Edition (Morse) #6255, \$11.95.

Timex/Sinclair

NEW! Timex/Sinclair™ Color Graphics (Hampshire) #1064, \$12.95.

COMING SOON! Management Decision Tools for the Timex/Sinclair™ (McNitt) #2101, \$12.95.

COMING SOON! Timex/Sinclair™ BASIC (Chorles) #2102, \$10.95.

COMING SOON! Timex/Sinclair™ Color Games (Hampshire) #1065, \$12.95.

COMING SOON! Timex/Sinclair™ Picture Book (Nader) #2103, \$9.95.

PET

BASIC Conversions Handbook for Apple™, TRS-80™, and PET™ Users (Brain Bank) #5534, \$8.95.

I Speak BASIC to My PET™ (Jones) teacher's manual #6166, \$17.45; student text #6178, \$8.45.

PET™ Graphics (Hampshire) #1051, \$12.95.

Library of PET™ Subroutines (Hampshire) #1050, \$16.50.

Prices subject to change

To order, contact your local Hayden sales representative or call

1-800-631-0856

operator C003

In NJ call (201) 366-2022, ext. 19

Commodore 64

COMING SOON! I Speak BASIC to My Commodore 64™ (Jones) teacher's manual #6172, \$17.45; student text #6182, \$8.45.

COMING SOON! Commodore 64™ Graphics (Hampshire) #1069, \$12.95.

COMING SOON! Commodore 64™ Programs for the Home (Stemberg) #5176, \$14.95.

TRS-80

The BASIC Conversions Handbook for Apple™, TRS-80™, and PET™ Users (Brain Bank) #5534, \$8.95.

I Speak BASIC to My TRS-80™ (Jones) teacher's manual #6164, \$17.45; student text #6174, \$8.45.

The Softside Sampler: TRS-80™ Entertainment Programs (Wilhom) #5496, \$9.95.

Programs for Beginners on the TRS-80™ (Blechnan) #5182, \$9.95.

Z80 Instruction Handbook (Wadsworth) #6275, \$5.95.

Z80 Software Gourmet Guide and Cookbook (Wadsworth) #6276, \$15.95.

Languages

COMING SOON! Introduction to C Programming (Kochan) #6261, \$18.95.

Secrets of Better BASIC (Mau) #6254, \$14.95.

Pascal With Style: Programming Proverbs (Lodgare, Hueros, Nagn) #5124, \$9.50.

Problem Solving Principles for Ada Programmers: Applied Logic, Psychology, and Grit (Lewis) #5211, \$10.95.

General

CP/M® Revealed (Dennan) #5204, \$13.95.

NEW! Robotics Age: In the Beginning (Helmers) #6325, \$16.95.

Apple, Commodore 64, Osborne, TRS-80, and Visi are trademarks of Apple Computer, Inc., Cambridge Business Machines, Inc., Osborne Computer Corp., Radio Shack, and Texas Instruments, respectively. Basic is a trademark of Intel Corporation. Copyright 1982 by Hayden Book Company, Inc. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without permission in writing from Hayden Book Company, Inc. and Hayden Book Company, Inc. and Hayden Book Company, Inc.



screen, with well-done graphics; and the auctions are choreographed like a Virginia reel, with buyers and sellers stepping forward and back, forward and back, raising and lowering their price until they finally come together and agree. Even your supplies and M.U.L.E. installations are graphically represented.

And your shambling, lazy, stubborn M.U.L.E. is a masterpiece of animation with style.

Fantasy Chess

Strategy and conflict games, in the days before computers, always had a problem: time and realism. The more realistic the game is, the more tedious it gets, moving little army pieces or keeping track of how many wounds your character has sustained. And the less realistic the game is, the more frustrating it is when your well-planned attack is wrecked by a streak of unbelievably bad rolls of the dice.

Some games, like chess, simply ignore realism: in each individual battle, the attacker always wins. Others, like *Diplomacy*, ignore tactics and move the game to the level of negotiations, where you quickly find out how untrustworthy your friends are.

With *Archon: The Light and the Dark*, by Anne Westfall, Jon Freeman, and Paul Reiche III, the computer lets the gamer have it all. The game is played on a chessboard – but this board isn't all light and dark squares. About half the squares cycle through various colors, from light to dark and back again. If you're the dark player, your icons (pieces) have much more power on dark squares, and are weaker on the light ones; this gives you a powerful advantage when the majority of the squares on the board are dark.

The icons each have different powers, and move in different ways. Your leading icon is either a wizard (light) or a sor-

ceress (dark), which has a repertoire of powerful spells, each of which can be cast only once. Other icons can walk, fly, or teleport a certain number of squares in each turn.

When your icon moves onto an enemy square, you don't just take the square. You have to fight for it. The square immediately expands to fill the entire screen, and your two icons meet in mortal combat. Some are infighters, and must move in close; others fire missiles at various speeds; others have an aura which wards off enemy blows and damages the enemy when it gets too close. If the battle is fought on a dark square, the dark icon has much greater endurance; on a light square, the light icon has the advantage. The action in the battle is as exciting as any arcade game.

And when the battle is over, the victor has the square – unless evenly matched icons destroyed each other.

As with chess, it takes a while to learn all the icons and their various strengths, and it takes more than a little agility and practice to master the techniques of battle. But if it were too easy, it wouldn't be fun.

The computer player is very, very good. I suggest you learn this game with an evenly matched friend – it'll be a while before you can give the computer a run for its money. *Archon* is available for the Atari, Apple and Commodore 64.

Training Your Pieces

Worms, by David S. Maynard, is that rare thing: an entirely new game, which is not only fun to play, but fascinating, often beautiful to watch. The idea of winning is almost secondary to the sheer pleasure of watching the game play out on the screen. Versions are available for Atari and Commodore 64.

Four "worms" of different colors are at the center of a dot-filled screen. The worms are



Archon, from Electronic Arts, is a fantasy chess game with fast-action battles between pieces.

really lines, spanning the gap between two dots. Each dot can have up to six lines radiating from it. When all six possible positions are filled, that dot and all the lines radiating from it become the color of the worm that finished filling it. You only get points for the dots you fill. When your worm runs into a place from which there is no escape – no unfilled dot to move to – it dies. When all worms have died, the game is over, and the winner is the player whose worm has finished the most dots.

The best feature of *Worms*, though, is that instead of controlling every choice your worm makes, you actually *train* your worm. There are dozens of possible configurations for each dot your worm might come to – different numbers of lines already drawn, in different places, combined with the six possible angles from which your worm might have approached the dot. When you are training a new worm, each time it reaches a configuration it hasn't seen before, the game stops for a moment while you decide what direction the worm should go. Once you've decided, from then on it will *always* make that choice whenever it sees that identical configuration.

After a very short time, your worm doesn't stop at all – it is fully trained, and continues to do everything you trained it to do. If your training was good, it will finish many dots; if your training wasn't so good, it will either tie itself in a knot and die,

The Light Pen at the Right Price:

THE LIGHT PEN

Shown actual size

\$34⁹⁵
Each

This is the **right** pen —a truly affordable peripheral. As an education aid to young children it is without equal, especially for pre-schoolers without keyboard skills. They simply touch the screen with the pen and a display is altered or new information is entered.

Plus as an aid to games, it offers comparable utility to a joystick.

Create your own programs with The Light Pen or choose from our software which includes a simple draw routine, checkers and hangman; or backgammon and chess. The Right Pen at the right price—maximum utility and minimum cost.

Prices subject to change without notice. See your local dealer or order direct. New catalog available. Add \$3.00 for postage and handling. Credit card orders call toll free.

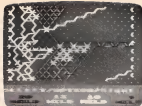
1-800-334-SOFT

DEALER INQUIRIES INVITED

programmer's institute

a division of **futurehouse**

p.o. box 3470, dept. C, chapel hill, north carolina 27514, 919-967-0861



Train your worm and watch it compete for survival in *Worms*, from Electronic Arts.

or string itself out all over the screen, never finishing dots at all, just leaving long trails for better-trained worms to come in and finish.

In other words, you create a creature that seems to be alive. You can save worms, too, and use them again. The computer can also generate worms according to several possible parameters. And when the worms are fully trained, you can sit back and watch them make their patterns on the screen. At the fastest speed setting it's as exciting as a hotly contested race; at the slower speeds, it is fascinating to study the geometric patterns as the designs unfold.

Seeds and Spacewalking

Jaron Lanier's *Moondust* Creative Software cartridge for the Commodore 64, like *Worms*, is a highly original game concept that could not exist without the computer. With a single joystick, you control a spacewalker and several "moondrop ships" with the same motion. When you make them turn, they move in gradual curves rather than sudden angles, and since they leave a trail of gradually fading moondust behind them, the screen display is graceful and strange—a world you have never visited before. Add to this the haunting music, and *Moondust* is fascinating to play for the sheer beauty of it.

It's also fun. You must maneuver your spacewalker away

from the center of the screen, where he leaves a single seed at the spot you choose. After that, you must maneuver the ships to pass over the seed. Each time they pass over the seed, they draw a trail of seed squares after them. You must try to draw the trail of seed squares until they reach the center of the screen; when they do, the energy field dances. However, the seed can only be drawn out into a limited number of squares, and if you haven't reached the center in time, the game ends. And each time the spacewalker collides with a ship, he gets bashed; too many collisions and he is knocked right out of the game.

Like the Electronic Arts games, this is a home computer game. It would never make it in the arcades. The very things that make it so good—the smooth and ballet-like movement, the gentle mood of the music, the original, challenging, thoughtful play system—would all be lost next to razzle-dazzle games. This game will make you glad you bought a home computer.

A Musical Toy

When children start playing around with music, the results can be awful. Endless scales and practice songs, sawing at a violin, pounding at a piano, blasting down walls with a trumpet—parents of children who are learning music deserve medals.

Wes Horlacher's *The Magic Melody Box*, available for Atari from APX, takes all the pain out of a child's first experiments with music, and helps children learn to visualize pitch and duration.

At the beginning of each new tune, you are asked to decide how *fast* and *slow* you want your tune to be. Those words are deceptive—you aren't choosing speed so much as you are choosing a rhythm, a pattern of note durations ranging from whole notes to eighth notes, with some more complex

rhythms in between.

Once you have chosen, an orange box appears on the screen, with the rhythm graphically represented below it. You start at the left side of the box and, with the joystick, draw a line to the right. You can move the joystick up or down to raise or lower the pitch; the longer your line stays on one pitch, the longer your finished tune will play that note.

When you reach the right-hand edge of the screen, your tune is finished. While you listen, the program makes several quick, soft passes through your tune. The wait is worth it. When your tune plays again, the program has added harmonies that turn it into a full four-voice arrangement, four measures long. Your tune plays twice; then a computer-generated interlude varies your theme for four measures; then your tune plays again.

Musical purists will probably scream about "manufactured" harmonies. I can only answer that the results here are not tin-can standard progressions: the harmonies are fully responsive to the notes of your tune. The variation in the interlude is mathematically, and musically, derived from your melody. And the result is truly enjoyable music which is nevertheless under your control to a surprising degree. And the two-dimensional method of *drawing* a melody helps children visualize pitch much more effectively than does the confusing musical staff.

The Magic Melody Box isn't good just because it makes children's experiments endurable, though that is certainly a virtue. In fact, while I enjoyed my children's music and the hours of delight they got from it, I got even more pleasure from experimenting with it myself. I've composed music and played several instruments, and *The Magic Melody Box* certainly doesn't replace the orchestra, but it *does*

use the computer to remove many layers of theory and many hours of practice which usually stand between the creative impulse and the aesthetically pleasing sound.

I wish other programmers would learn from Horlacher's deceptively simple virtuoso music program: the value of computer sound is not confined to sound synthesis. In fact, the computer can and should be used to remove barriers between the would-be musician and his music. This program reminds you why producing music is called "playing."

What do these games have in common that makes them excellent? They are original; they do what they set out to do very, very well; they allow the player to take part in the creativity; they do things that only computers can do.

Above all, though, is the fact that I didn't want to stop playing. And when I wasn't playing, I didn't want to stop watching other people play. That's as good a definition of fun as I can think of.

M.U.L.E.

Archon: The Light and the Dark
Worms

Electronic Arts

2755 Campus Drive
San Mateo, CA 94403
\$39.95

Moon dust

Creative Software
230 East Caribbean Drive
Sunnyvale, CA 94086
\$34.95

The Magic Melody Box
Atari Program Exchange
155 Moffett Park Drive, B1
P.O. Box 427
Sunnyvale, CA 94086
\$17.95

Get Omni quality for as little as \$1.99... even if all you want is a 10 pack.

ARCHIVE

152 Boston Turnpike
Shrewsbury, MA 01545
(800) 343-0314
In Mass: (617) 756-2960



Call toll free
(800) 343-0314
In Mass: (617) 756-2960

Call if you're not sure which disk is compatible with your system. Call for prices on 96 tpi and special formats. We offer an unconditional money-back warranty. We're here to help.

Be sure to indicate system/disk name and model # below.

5 1/4" disks		8" disks		Total Cost
Cost per 10 pack	Quantity	Cost per 10 pack	Quantity	
Single side/single density	\$19.90	\$24.90		\$
Single side/double density	\$23.90	\$31.90		\$
Double side/single density		\$34.90		\$
Double side/double density	\$37.50	\$37.50		\$
Hip/Hoppy reversible	\$39.90	\$39.90		\$
Plastic library case (in lieu of soft storage box)	\$ 2.99	\$ 3.49		\$
Shipping and handling (\$2.00 first 10 pack, 40¢ additional 10 packs. Continental U.S. only)				\$
5% sales tax (Mass only)				\$

☐ Check ☐ COD ☐ MasterCard ☐ VISA Total \$

Card # _____ Exp. _____ Name _____

System/disk model # _____ Address _____

Tel. _____

COMPUTE!

The Resource

The Timex/Sinclair 2040 Printer

When Clive and Ian Sinclair designed the \$99 computer, the world was truly amazed. Sometimes lightning does strike twice, because they've done it again, with a \$99 printer.

As you would expect from Timex, the company that markets Sinclair's computer in America, this printer is small, inexpensive, and works perfectly when you take it out of the box.

What will the Timex/Sinclair 2040 Printer do? First of all, you can make a printed copy of your own BASIC programs. This can save you hours of trying to read your program off the TV screen, no easy task since the screen can handle only 22 lines at a time. Second, if you have created a picture on your screen with Timex/Sinclair's graphics, you can make a copy of that picture on the printed page. Third, it will print individual characters on the page, for simple word processing programs.

The 2040 is a particular kind of dot matrix printer. Each letter is printed by little wires that move, creating the letters by electrical charges that "burn" holes in a special paper. Each letter is made from a grid of dots, eight dots high and eight dots wide. The line length of the printed page is 32 characters across.

Setting It Up

After unpacking the printer, all you have to do is plug the printer cable into the back of the computer. If you have a RAM pack, you can plug the cable in between the computer and the RAM pack. The printer comes with its own 24-volt power supply, which plugs into any 110-volt wall socket.

Be careful, however, when connecting the printer. If you plug in the printer while the computer is on, the sudden rush of

Seth McEvoy

electricity could overload one of the integrated circuits. Also, if you attempt to print anything before you load the paper, it could damage the printing mechanism.

The printer has simple controls — an ON key and an OFF key. You can also test the printer by pressing the OFF button while pressing the ON button. If the printer is working correctly, it will print rows of 1's and 8's until you stop it by pressing OFF again. Furthermore, you can advance the paper by pressing ON, if the printer is already ON.

Unfortunately, the printer does not have a light to warn you when the power switch is on. The motor heats up a great deal, and if the printer is left on a long time, it may wear out some of the components.

Timex supplies one 82-foot roll of paper, 4 inches wide. Further rolls of this special thermal paper should be available from Timex dealers at \$2 a roll. Timex cautions you not to buy any other kind of paper, but the HP-85 computer from Hewlett-Packard uses the same kind of paper. Since the paper from Timex has a red strip to warn you when you are near the end of the roll, you're safest using Timex paper. (Perhaps you could ink the inner part of one end of a non-Timex roll with a red felt-tip pen.)

Making It Work

Using the printer is easy. You can use three special commands already built into Timex/Sinclair BASIC: COPY, LLIST, and LPRINT.

COPY is used to transfer whatever is on the computer screen to the printer. You may type it directly (by pressing the Z key) or it may be part of a program.

The figure shows what a digitized apple looks like on the printer. The picture was first "printed" on the screen (using the PRINT command) and then copied to the printer using the COPY command.

That apple was printed by using inverse spaces (Graphics key and Space) and shaded squares (Graphics key and Shift H).

If you look closely, you will notice that the tiny squares that make up the picture, such as the top of the apple stem, are not exactly square. You can also see the individual wire tracks across the picture. However, for \$99, this is quite acceptable. The person who buys a Timex/Sinclair computer is not likely to want to spend \$1000 for a high-resolution dot matrix printer.

Here is the program that was used to print the apple picture to the TV screen. We can make a copy of the program (listing) by typing LIST (Shift G).

```
100 REM
110 PRINT "APPLE"
120 PRINT "PICTURE"
130 PRINT "COPY"
140 PRINT "TO"
150 PRINT "PRINTER"
160 PRINT " "
170 PRINT " "
180 PRINT " "
190 PRINT " "
200 PRINT " "
210 PRINT " "
220 PRINT " "
230 PRINT " "
240 PRINT " "
250 PRINT " "
260 PRINT " "
270 PRINT " "
280 PRINT " "
290 PRINT " "
300 COPY
400 STOP
```



A IS FOR APPLE

Apple Picture by Laurie Smith

LLIST will print out whatever BASIC program is currently in memory. If you have a long program, it will print out the whole thing in one long roll.

Suppose you have a different application, say a simple word processor. You can use the LPRINT command to print individual letters on the printer. The computer waits until the entire line is ready, and then it prints your line.

The following program

prints all the letters, numbers, punctuation, and graphics characters that the Timex/Sinclair computer has available:

```

4 REM
5 LPRINT "
6 LPRINT "
7 LPRINT " PRINTABLE CHARACTERS"
8 LPRINT " ON THE TIMEX 204
9 LPRINT "
10 LET R=1
1000 LPRINT CHR$ R," "
1010 LET R=R+1
1020 IF R=65 AND R<128 THEN GOTO 1010
1030 IF R/16=INT (R/16) THEN GOT
0 1100
1040 IF R=128 THEN GOTO 1090
1050 GOTO 1080
1060 STOP
1100 LPRINT
1110 LPRINT
1120 GOTO 1040
1130 STOP

```

This program is fairly simple. The only odd part is in lines 1020 and 1040. Since the Timex/Sinclair stores all its BASIC commands as single numbers, we want to make sure that those commands (RUN, GOTO, etc.) are not printed. We already know what their letters look like.

When you run the program, this is what it should print out:

PRINTABLE CHARACTERS ON THE TIMEX 2040 PRINTER

```

. ! " # $ % & ' ( ) * + , - . / : ; < = > ?
[ \ ] ^ _ ` { | } ~
" " " " " " " " " " " " " " " " " " " "
" " " " " " " " " " " " " " " " " " " "
" " " " " " " " " " " " " " " " " " " "
" " " " " " " " " " " " " " " " " " " "

```

Other Features

The Timex/Sinclair printer is relatively fast, printing at a rate of 50 to 80 characters per second. It will COPY a full 24-line screen to the printer in less than 11 seconds. It is much quieter than most dot matrix printers, making a whirring noise not much louder than a tape recorder rewinding.

This printer will be greeted with enthusiasm by serious Timex/Sinclair computer users. Writing programs without being able to print out listings has been a problem, since you could only

view 22 lines of your program at a time. In a very long program, it seemed to take hours to find a particular line. Also, being able to print out the unique graphics of the Timex/Sinclair is a plus.

An earlier version has been available in England for quite some time, but the new 2040 has been changed to work with American voltages and it uses a better grade of thermal paper.

Once again, Sinclair is to be congratulated for inventing something smaller and less expensive than anyone else. Timex is to be congratulated for bringing it to America, and for energetically supporting their products. This printer fits in well with the Timex/Sinclair philosophy — it does the job without frills and without great expense to the consumer.

Timex/Sinclair 2040 Printer
Timex Computer Corporation
Waterbury, CT 06725
\$99.95

Modem with Printer Interface for Atari, Commodore, and Vic



Direct connect, autodial, autoanswer modem, also runs a parallel printer. 300 baud modem has built in Centronics printer port. Simultaneously prints whatever appears on your screen as it comes over the telephone.

One box does it all so you can receive the most from your computer. Terminal program supplied, complete and ready to run.

Auto-Print Microconnection retails for \$149.95.

the microperipheral corporation
2565 - 252nd Avenue NE, Redmond, WA, 98052
(206) 881-7544

Commodore 64® Software

Disqualender—a unique time management program tool. Allows permanent diary of schedule & appointments for 12 months on single disk. Simplifies monthly & hourly billing. Ideal for the professional
disk \$49.95

Inventory manager—a stand alone single drive system. Holds up to 1200 Records. Allows for back orders and provides for three level pricing up to 12 character item code. Produces reports & allows for daily entries. Ideal for small, growing business.
disk \$79.95

Restaurant manager—point of sale single disk Restaurant system. Allows up to 60 tables, 250 menu items, credit cards & tips. Produces kitchen & server reports
disk \$79.95

Amortizer—this program will amortize any loan. All you need for a printed amortization schedule is properly interfaced printer.
disk \$19.95

Dealer Inquiries Invited
send check or money order to:

SUNDIAL SOFTWARE ASSOCIATES INC.
P.O. Box 14507
Rochester, N.Y. 14614

For additional information—716-654-7107
Commodore 64 is a trademark of Commodore Business Machine

THE GREAT CHRISTMAS SALE! **FOR VIC-20 AND COMMODORE 64** **OWNERS**

No One! But No One! Can Compare **To** **PROTECTO** **ENTERPRIZES**

Best Prices • Over 500 Programs • Over 100
Accessories • Absolutely The Best Service •
One Day Express Mail • Immediate Replace-
ment Warranty • 15 Day Free Trial On All
Products • Programming Knowledge • Techni-
cal Knowledge • We Are The Only One In
The U.S.A. With Complete Support For The
Vic-20 And Commodore 64 Computer.

For Free Catalogs Write or Call

TO ORDER WRITE OR CALL: PROTECTO ENTERPRIZES, BOX 550, BARRINGTON, IL 60010

Call 312/ 382-5244
8 to 5 Weekdays 9-12 Saturdays

We Love Our Customers

COMMODORE 64

(more power than Apple II at half the price)

COMPUTER AND SOFTWARE CHRISTMAS SALE

VIC-20

(a real computer at the price of a toy)

\$99.50*

- 170K DISK DRIVE \$159.00
- TRACTION FRICTION PRINTER \$119.00

(* with software savings applied)

COMMODORE 64 COMPUTER \$99.50

You pay only \$199.50 when you order the powerful 64K COMMODORE 64 COMPUTER! LESS the value of the SPECIAL SOFTWARE COUPON we pack with your computer that allows you to SAVE OVER \$100 off software sale prices!! With only \$199.50 of savings applied, your net computer cost is \$99.50!!

SOFTWARE BONUS PACK \$29.95

When you buy the Commodore 64 Computer from Protecto Enterprises you qualify to purchase ONE SOFTWARE BONUS PACK for a special price of \$29.95! Normal price is \$49.95 (40 programs on disk or 24 programs on 5 tapes)

170 DISK DRIVE \$159.00

You pay only \$259.00 when you order the 170K Disk Drive! LESS the value of the SPECIAL SOFTWARE COUPON we pack with your disk drive that allows you to SAVE OVER \$100 off software sale prices!! With only \$100 of savings applied, your net disk drive cost is \$159.00.

TRACTION FRICTION PRINTER \$119.00

You pay only \$219.00 when you order the Com star TIF deluxe line printer that prints 8 1/2 x 11 full size, single sheet, roll or fan fold paper, labels etc. 40, 66, 80, 132 columns. Impact dot matrix, bi-directional, 80 CPS. LESS the value of the SPECIAL SOFTWARE COUPON we pack with your printer that allows you to SAVE OVER \$100 off software sale prices!! With only \$100 of savings applied, your net printer cost is only \$119.00.

80 COLUMN BOARD \$149.00

You pay only \$149.00 for this 80 Column Board, included with this board is word processor pack, electronic spread sheet and mail merge data base on two tapes, List \$249.00 (Disk add \$10.00)

80 COLUMN

WORD PROCESSING PACKAGE \$79.00
SCRIPT 44 EXECUTIVE WORD PROCESSOR is the finest available for the COMMODORE 64 Computer! THE ULTIMATE for PROFESSIONAL wordprocessing application. DISPLAYS 80 COLUMNS IN COLOR! Featuring simple operation, powerful text editing with a customized 250 word dictionary, complete cursor and insert/delete key controls, line and paragraph insertion, automatic deletion, centering, margin settings and output to all printers. Included is a powerful MAIL MERGE When used with THE COMPLETE DATA BASE PACKAGE. List \$99.00. Sale \$79.00. Coupon Price \$52.00 (Disk only)

WE
HAVE
THE
BEST
SERVICE

WE
HAVE
THE
LOWEST
PRICES

SPECIAL SOFTWARE COUPON

We pack a SPECIAL SOFTWARE COUPON with every COMMODORE 64 COMPUTER. DISK DRIVE-PRINTER-MONITOR we sell! This coupon allows you to SAVE OVER \$100 OFF SALE PRICES! \$200-\$300 savings are possible!

(example)

PROFESSIONAL SOFTWARE COMMODORE 64

Item	List	Coupon
Executive Word Processor	\$99.00	\$52.00
Complete Data Base	\$89.00	\$40.00
Electronic Spreadsheet	\$69.00	\$40.00
Accounting Pack	\$69.00	\$32.00
Total 5 Word Processor—Plus		
Type	\$69.00	\$37.00
Text Total 12.5 Word Processor—		
Type	\$44.95	\$26.00
\$49.95	\$26.00	
Total Label 25	\$24.95	\$12.00
Disk	\$25.00	\$15.00
Quick Brown Fox Word Processor	\$69.00	\$40.00
Programmers Reference Guide	\$20.00	\$12.50
Programmers Helper	\$49.00	\$40.00
Basic Tutor	\$29.95	\$15.00
Training Teacher	\$29.95	\$15.00
Sprite Designer	\$19.95	\$10.00
Mechanics	\$19.95	\$10.00
Weather War II	\$19.95	\$10.00
Musical Master	\$19.95	\$10.00
EDU Pack	\$24.95	\$13.00
30 Maze Game	\$24.95	\$13.00
Professional Jolly Stick	\$24.95	\$12.00
Light Pen	\$39.95	\$20.00
Deluxe Data Cover	\$ 9.95	\$ 4.00

(and many other items)

Sample SPECIAL SOFTWARE COUPON

Write or call for

PROFESSIONAL BUSINESS SOFTWARE EXECUTIVE QUALITY BY TIME WORKS!

The Cadillac of business programs,
for Commodore 64 Computers

Item	List	*SALE
Inventory Management	\$69.00	\$69.00
Accounts Receivable	\$69.00	\$69.00
Accounts Payable	\$69.00	\$69.00
Payroll Management	\$69.00	\$69.00
Cash Flow Management	\$69.00	\$69.00
Sales Analysis	\$69.00	\$69.00
General Ledger	\$69.00	\$69.00
(*COUPON PRICE \$59.00)		

\$77.00*

- 40-80 COLUMN BOARD \$89.00
- VOICE SYNTHESIZER \$59.00

(* with Cassette and Gorkex purchase)

VIC-20 COMPUTER \$77.00

You get the Commodore VIC 20 Computer for only \$77.00 when you buy at sale prices. The Commodore Data Cassette for only \$69.00 and the Gorkex Introduction to Basic Program for only \$19.95. TOTAL LIST PRICE \$302.95. SPECIAL PACKAGE SALE PRICE \$165.25

40-80 COLUMN BOARD \$89.00

A fantastic price breakthrough for VIC 20 owners on this most wanted accessory!! Now you can get 40 or 80 Columns on your TV or Monitor Screen!! Plus we add a word processor with mail merge, electronic spread sheet, time manager and terminal emulator!! These PLUS programs require 8K or 16K RAM memory (Disk add \$10.00)

VOICE SYNTHESIZER \$59.00

Voice Bank Make your VIC 20 COMPUTER TALK!! Has features equivalent to other models costing over \$370.00. You can program an unlimited number of words and sentences and even adjust volume and pitch. You can make adventure games that talk! A must for enhancing your programming creativity and pleasure.

60K MEMORY EXPANDER \$59.00

Socket — Switch selectable — Reset button — Ribbon cable. A must to get the most out of your VIC 20 Computer. Includes FREE \$29.95 adventure game.

8K RAM CARTRIDGE \$39.95

Increases programming power 2 1/2 times. Expands total memory to 32K (33,000 bytes). Memory block switches are on outside of cover! Includes FREE \$16.95 game.

16K RAM CARTRIDGE \$69.00

Increases programming power 4 times. Expands total memory to 41K (41,000 bytes). Memory block switches are an outside cover! Includes FREE \$29.95 adventure game!!

12" GREEN SCREEN MONITOR \$99.00

Excellent quality GREEN PHOSPHORUS VIDEO MONITOR with antiglare, 1920 characters (80 characters x 24 rows). Save your TV! A must for VIC 20 or Commodore 64 Cables.

12" AMBER SCREEN MONITOR \$119.00

Premium quality AMBER VIDEO MONITOR with antiglare, 80 characters x 24 rows, exceptional ly clear screen, faster scanning, 1000 lines. PLUS \$9.95 for VIC 20 or Commodore 64 Cable.

• LOWEST PRICES • 15 DAY FREE TRIAL • 90 DAY FREE REPLACEMENT WARRANTY

• BEST SERVICE IN U.S.A. • ONE DAY EXPRESS MAIL • OVER 500 PROGRAMS • FREE CATALOGS

Add \$10.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add \$20.00 for CANADA, PUERTO RICO, HAWAII orders. WE DO NOT EXPORT TO OTHER COUNTRIES.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail! Canada orders must be in U.S. dollars. VISA — MASTER CARD — C.O.D.

PROTECTO ENTERPRISES

(WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

SUPER COM-STAR T/F 15" PRINTER SALE \$379⁰⁰

NOW YOU CAN BUY A TRACTOR-FRICTION 15" CARRIAGE PRINTER FOR AN INCREDIBLE \$379⁰⁰

	star COMSTAR 15"	EPSON* MX-100/Type III	OKIDATA* MICROLINE 83A
Warranty	180 day	90 day	90 day
Buffer	2.3 K	1 Line	1 Line
CPS	100	80	120
CPI	10.12.17	10.17	10.17
Over 80 Type Fonts	Yes	No	No
Block Graphics	Yes	No	No
Special Character Sets Available	Yes	No	No
Roll Paper Holder Standard	Yes	No	No
Suggested Retail Price	\$599.	\$749.	\$899.
Special Price	\$379.		

This refers to standard warranty. Coverage varies by manufacturer.
Complete information is available at your place of purchase.

*Epson, Epson and Epson are registered trademarks of Epson America, Inc. and Okidata Corp. respectively.



Now you can save big on the Com-Star 15" dot matrix printer from Protecto, while they last!

It's the 15" carriage printer that combines the most advanced features with a price that's better than ever. And component by component, Com-Star 15" is so reliable, Protecto can warranty it for up to twice as long as its major competitors.

The popular Com-Star 15". A great printer at a truly great price. When you add it up, it figures to be a super sale.

- LOWEST PRICES • 15 DAY FREE TRIAL • 90 DAY FREE REPLACEMENT WARRANTY
- BEST SERVICE IN U.S.A. • ONE DAY EXPRESS MAIL • FREE CATALOGS

Add \$17.50 for shipping, handling and insurance. Illinois residents please add 6% tax. Add \$35.00 for CANADA, PUERTO RICO, HAWAII orders. WE DO NOT EXPORT TO OTHER COUNTRIES.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail! Canada orders must be in U.S. dollars. VISA — MASTER CARD — C.O.D.

**PROTECTO
ENTERPRISES** (WE LOVE OUR CUSTOMERS)
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

80 COLUMN PRINTER SALE—\$149.00*

COM-STAR T/F

Tractor
Friction
Printer

only **\$219**

(Parallel or Serial)



- Lowest price quality tractor friction printer in the U.S.A. • Fast 80 characters per second
- 40, 46, 66, 80, 96, or 132 characters per line spacing • Prints labels, letters, graphs, and tables
- List your programs • Print out data from modem services

*STX-80 COLUMN PRINTER—\$149.00

Prints full 80 columns. Super silent operation, 60 CPS, prints Hi-resolution graphics and block graphics, expanded character set, optionally clear characters, fantastic print quality, uses inexpensive thermal roll paper!

DELUXE COMSTAR T/F PRINTER—\$219.00

The Comstar T/F is an excellent addition to any micro-computer system. (Interfaces are available for Apple, VIC-20, Commodore-64, Pot, Atari 400 and 800, and Hewlett Packard). At only \$219 the Comstar gives you print quality and features found only on printers costing twice as much. Compare these features.

- **BIDIRECTIONAL PRINTING** with a LOGIC SEEKING CARRIAGE CONTROL for higher throughput in actual text printing. 80 characters per second.
- **PRINTING VERSATILITY:** standard 96 ASCII character set plus block graphics and international scripts. An EPROM character generator includes up to 234 characters.
- **INTERFACE FLEXIBILITY:** Centronics is standard. Options include EIA RS232C, 20mA Current Loop.
- **LONG LIFE PRINT HEAD:** 100 million character life expectancy.
- **THREE SELECTABLE LINE SPACINGS:** 5, 6 or 12 lines per inch.

• **THREE SELECTABLE CHARACTER FITCHES:** • 10, 12 or 16.5 characters per inch. 132 columns maximum. Double-width font also is standard for each character pitch.

• **PROGRAMMABLE LINE FEED:** programmable length from 1/144 to 255/144 inches.

• **VERTICAL FORMAT CONTROL:** programmable form length up to 127 lines, useful for short or over-sized preprinted forms.

• **FRICTION AND TRACTOR FEED:** will accept single sheet paper.

• **224 TOTAL CHARACTERS**

• **USES STANDARD SIZE PAPER**

If you want more try —

Premium Quality COMSTAR T/F SUPER-10X PRINTER—\$299.00 More Features Than RX-80

For \$299 you get all of the features of the Comstar T/F plus 10" carriage 120 cps, 9 x 9 dot matrix with double strike capability for 18 x 18 dot matrix. High resolution bit image (120 x 144 dot matrix), underlining, backspacing, left and right margin settings, true lower descenders, with super and subscripts, and prints standard, italic, Block Graphics, special characters, plus 2K of user definable characters. For the ultimate in price performance ghs Comstar T/F Super 10" is the pack!

Double Immediate Replacement Warranty

We have doubled the normal 90 day warranty to 180 days. Therefore if your printer fails within "180 days" from the date of purchase you simply send your printer to us via United Parcel Service, prepaid. We will IMMEDIATELY send you a replacement printer at no charge via United Parcel Service, prepaid. This warranty, once again, proves that WE LOVE OUR CUSTOMERS!

15 DAY FREE TRIAL

OTHER OPTIONS

Extra Ribbons	\$ 9.95
Roll Paper Holder	32.95
Roll Paper	4.95
5000 Labels	19.95
1100 Sheets Fan Fold Paper	13.95

Add \$17.50 shipping, handling and insurance. Illinois residents please add 6% tax. Add \$40.00 for CANADA, PUERTO RICO, HAWAII, ALASKA orders. WE DO NOT EXPORT TO OTHER COUNTRIES. Enclose cashiers check, money order or personal check. Allow 14 days for delivery, 2 to 7 days for phone orders. 1 day express mail available! Canada orders must be in U.S. dollars.

PROTECTO

ENTERPRIZES (WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

SUPER-10"

ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890

GRAFSTAR (Apple interface card - "Like Grappler Plus") SALE \$69.00.

Commodore Files For Beginners

Part 1

Jim Butterfield, Associate Editor

In Part 1 of this article, Jim Butterfield explains what files are and how to create them on either disk- or tape-based systems.

A computer can maintain files. They are something like the files we can keep in a filing cabinet. We may add information, remove items, change data, or just look at what's in the file.

Let's take a look at how we can create and recall information within files. Our examples will be Commodore-oriented (PET, CBM, VIC, and 64), although the principles generally apply to all computers.

The examples here involve tape or disk files. However, we won't use a special type of disk file called a *relative* file. Instead, we'll stay with *sequential* files, which are simpler, often more useful, albeit less powerful.

Ground Rules

A file is stored on disk or tape as a series of magnetic impulses. Once we have stored information in a file, it will stay there until we remove (or "scratch") it.

If you want to change a sequential file through additions, deletions, or changed data, you must create a new copy of the file containing these changes. You can't change the old file as it stands. This apparent limitation can often prove to be an advantage, however: it encourages users to keep old files as historical data or as a backup resource.

Files are similar to programs in many ways. We save both programs and files on disk or tape. Both contain data. Apart from the obvious distinction, there's a difference in usage between programs and files: files often change, programs seldom do so. As an example, a program to record student marks shouldn't need changing once it is checked out unless the school changes its proce-

dures significantly. But the file changes from class to class, from test to test.

Programs read and write files. But files don't belong to a single program. A file of student marks might be used by several programs such as an updating program, a report printer program, and a statistical analysis program. Similarly, programs often are not locked in to a fixed set of files: a program which updates student marks might be used for several different subjects, classes, and grades, each of which would have a distinct set of files.

File Components

The elements of a file aren't hard to recognize. A *file* is a whole collection of information on some subject; it's like a file folder in your desk. A *record* is information on a single person, place, or thing. We use these words in English conversation: "This is a file of all my books; I have a record of every book I own." Within each record, a *field* is an item of information—for example, title, author, publisher, date published, price, etc.

When you're planning to set up a computer file, it's very important to work out, in detail, what fields each record will have. If you forget one, it will be a tough job to add the information later. Also, planning your fields will give you an idea of how many characters will be in each record. Multiply this by the number of records you expect to have, and you'll be able to estimate the amount of disk space or length of tape that the computer will need.

First File Mechanics

In order to read or write a file, your program must go through three distinct phases:

1. The file must be OPENed. We must give information on such things as: what physical device (disk or tape); what the filename must



SANYO MONITOR SALE!!



9" Data Monitor

- 80 Columns x 24 lines
- Green text display
- Easy to read - no eye strain
- Up front brightness control
- High resolution graphics
- Quick start - no preheating
- Regulated power supply
- Attractive metal cabinet
- UL and FCC approved

• 15 Day Free Trial - 90 Day Immediate Replacement Warranty

9" Screen - Green Text Display	\$ 79.00
12" Screen - Green Text Display (anti-reflective screen)	\$ 99.00
12" Screen - Amber Text Display (anti-reflective screen)	\$119.00
14" Screen - Color Monitor (national brand)	\$249.00

Display Monitors From Sanyo

With the need for computing power growing every day, Sanyo has stepped in to meet the demand with a whole new line of low cost, high quality data monitors. Designed for commercial and personal computer use. All models come with an array of features, including up-front brightness and contrast controls. The capacity 5 x 7 dot characters as the input is 24 lines of characters with up to 80 characters per line.

Equally important, all are built with Sanyo's commitment to technological excellence. In the world of Audio/Video, Sanyo is synonymous with reliability and performance. And Sanyo quality is reflected in our reputation. Unlike some suppliers, Sanyo designs, manufactures and tests virtually all the parts that go into our products, from cameras to stereos. That's an assurance not everybody can give you!



**• LOWEST PRICES • 15 DAY FREE TRIAL • 90 DAY FREE REPLACEMENT WARRANTY
• BEST SERVICE IN U.S.A. • ONE DAY EXPRESS MAIL • OVER 500 PROGRAMS • FREE CATALOGS**

Add \$10.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add \$20.00 for CANADA, PUERTO RICO, HAWAII orders. WE DO NOT EXPORT TO OTHER COUNTRIES.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail! Canada orders must be in U.S. dollars. Visa - MasterCard - C.O.D.

PROTECTO
ENTERPRIZES (WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

COMMODORE 64

80 COLUMN BOARD

\$149.00*

wordprocessor
w/database mailmerge



electronic spreadsheet

The dream of seeing 80 columns on the screen at one time is now a reality. The Protecto Expansion Board converts your Commodore 64 to 80 columns! PLUS you get a word processor with database mailmerge, an electronic spreadsheet, and a terminal emulator. List \$249. SALE \$149. (Disk Programs add \$10.00).

80 COLUMN MONITOR SALE

	List	Sale
9" Screen - Green Text Display	\$139	\$ 79
12" Screen - Green Text Display (anti reflective screen)	\$199	\$ 99
12" Screen - Amber Text Display (anti reflective screen)	\$219	\$119
14" Screen - Color Text Display	\$299	\$249

VIC 20 COMPUTER 40-80 COLUMN BOARD LIST \$149.00 SALE \$89.00

- 15 DAY FREE TRIAL
- WE HAVE LOWEST COMMODORE 64 PRICES
- WE HAVE OVER 500 PROGRAMS
- VISA • MASTERCARD • COD
- WE LOVE OUR CUSTOMERS

PROTECTO ENTERPRISES

(WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

VIC 20 40-80 COLUMN BOARD



only \$ **89**⁰⁰



Now you can get 40 or 80 Columns on your T.V. or monitor at one time! No more running out of line space for programming and making columns. Just plug in this board and you immediately convert your VIC-20 computer to 40 or 80 columns! PLUS, you get a Word Processor, Mail Merge program, Electronic Spreadsheet (like VISICALC) and Terminal Emulator! These PLUS programs require only 8K RAM memory and comes in an attractive plastic case with instructions. List \$149 Sale \$89

"15 DAY FREE TRIAL"

- We have the lowest VIC-20 prices
- We have over 500 programs
- Visa - Mastercharge - C.O.D.
- We love our customers!

**PROTECTO
ENTERPRIZES** (WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order



MAKE YOUR VIC-20 COMPUTER TALK

when you plug in our

ONLY

\$ **59**⁰⁰

VOICE SYNTHESIZER

You can program an unlimited number of words and sentences and even adjust volume and pitch. You can make:

- Adventure games that talk
- Real sound action games

This voice synthesizer is VOTRAX based and has features equivalent to other models costing over \$370.00. To make programming even easier, our unique voice editor will help you create words and sentences with easy to read, easy to use symbols. The data from the voice editor can then be easily transferred to your own programs to make customized talkies. Includes "test to speech software". Just type what you want to hear! Can be used with "Scott Adams" VIC-20 and Aardvark Adventure Games!

"15 DAY FREE TRIAL"

- We have the lowest VIC-20 prices
- We have over 500 programs
- Visa - Mastercharge - C.O.D.
- We love our customers!

**PROTECTO
ENTERPRIZES** (WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

COMPUTER BOOKS

★ ★ SALE ★ ★

VIC-20 and COMMODORE-64

- Learn Programming • Learn Graphics • Ready Made Programs
- Now You Can Explore The Inner Workings of your Computer*

Beginning Assembly Language Programming For Your VIC or 64

Now you can learn the powerful assembly language, to get the most out of your computer. Easy to use and simple to understand, comes with machine language monitor. Perfect for the beginner — specify VIC or 64.

List \$29.95 / Sale \$24.95

DATAFLUX
Computer Learning Series



Commodore 64 Color Graphics: A Navigators Guide (300 pages)

This book is the first in a series designed to provide the newcomer with simple explanations of the Commodore 64's operation, as well as the programming concepts involved in creating color graphics. Each of the topics discussed will include a BASIC program, line by line explanations of the program, and figures or photos of what the programmer's screen should look like. When you complete the book, you can expect to be able to read, understand and write BASIC programs for generating color graphics. List \$15.95. Sale \$13.95.

VIC Graphics

Finally you can learn how to do color plotting, drawing maps, pie charts, line graphs and even moving shapes on the screen. All in high-resolution with easy to understand instructions. (This is a must for game designers) requires Super Expander.

List \$14.95 / Sale \$11.95



The Commodore Users Encyclopedia

Easy to use information, cross referenced for the beginner or the intermediate user! Includes operating system secrets, BASIC programming, software and hardware! This book is a must for the beginning user! Specify VIC or 64. List \$19.95. Sale \$14.95.

VIC Revealed

The most comprehensive explanation of the hardware capabilities of your VIC-20. All the chips and corresponding instruction sets are included *plus* BASIC ROM variables and sound effects programming. (A must for Assembly language programming.)

List \$14.95 / Sale \$11.95



Elementary Commodore-64

Now you can learn how to do more than play games. Even if you're already writing programs, this book has all the information you need and will satisfy the rest of the family's desire to participate. Step by step chapters lead you through the process of hooking up the computer, loading and saving programs on either disk or tape and using the powerful cursor commands for easy correcting. The sample programs are fun and useful too. You will learn how to create music, graphics and all sorts of handy utilities like checkbook balancers and file systems.

List \$16.95 / Sale \$13.95



Commodore-64 Reference Guide — List \$19.95 / Sale \$16.95

(must have for programming)



VIC-20 Reference Guide — List \$16.95 / Sale \$13.95

(must have for programming)

Add \$3.00 for postage. Add \$6.00 for CANADA, PUERTO RICO, HAWAII orders. WE DO NOT EXPORT TO OTHER COUNTRIES

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery. 2 to 7 days for phone orders. 1 day express mail! Canada orders must be in U.S. dollars. We accept Visa and MasterCard

PROTECTO
ENTERPRISES
WE LOVE OUR CUSTOMERS
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/342-5244 to order

be; and whether the file is to be an input or output type. This is the only time we give any of this information. In addition, we give this file a reference number, called a "logical file number"; this is the only number that we will use in the following commands.

2. We may write to the file (using PRINT#) or read from the file (using INPUT# or GET#) as much as we like. We identify the file only by its logical file number.

3. Finally, the file must be CLOSED. This winds up activity on this file, unless we OPEN it again later. Once again, we identify the file only by its logical file number.

Note that the first step (OPEN) is the only time we deal with the details of what kind of a file is involved. Once the file is open, we never again mention whether it is disk or tape, or some other device for that matter. If we were reading a program and saw the statement:

```
PRINT#5,"HELLO"
```

we would not know whether the output was going to tape, disk, printer, modem, or other device until we backtracked and saw what the OPEN 5 statement said.

This turns out to be a good thing. With minor changes to a program – just in the OPEN statements – I could redirect output to any device I chose. This makes programs flexible and can help in the debugging process when you are writing the program.

Now that we've seen some of the rules, we're ready to go ahead and write a data file.

First Planning

Let's plan a simple file for students.

Our fields will be: surname, student number, and mark. That's not much, but it will show the principles involved.

We estimate sizes with:

Surname: 15 characters maximum
 8 characters typical
Student number: 4 characters
Mark: 3 characters maximum
 2 characters typical

Average record size will be $8 + 4 + 2$, plus 3 (one RETURN character for each field). Total record size is then 17; we think we may have 200 students maximum, so we estimate the file size at 3400 characters (3.4K memory; about 14 disk sectors at 254 bytes per sector; about 18 tape blocks at 191 bytes per block which will take about a three-minute length of tape). We will not be writing 200 student records for our example, of course.

A First Run

To create the file, we would normally write a pro-

gram. We'll do that later as part of a review; but let's write this file using direct BASIC statements. This way, you can watch as the file comes into being. Do be careful – an error message during the creation process could wreck our file.

Our first step is to open the file. If you have disk, type:

```
OPEN 1,2,"0:STUDENTS,S,W"
```

If you have tape, type:

```
OPEN 1,1,2,"STUDENTS"
```

The disk will whirr, or the computer will display PRESS RECORD AND PLAY. Obey the instructions, and let's talk for a moment about what we have typed.

In either case, we have opened a file using a working number (logical file number) of 1. That's the only information we'll use for the remainder of this exercise. The second number is the device: 8 for disk, 1 for tape. The third number has a different meaning for disk versus tape. On the disk, this is called a "secondary address"; we pick an unused number from 2 to 14 and "give" it to the disk for its internal use. On tape, this is called a "command"; a value of 2 instructs the computer that this is a write file, and will be the last file on this tape (an "end of file" block will be written behind the file).

The name of the file is STUDENTS; this information will be written into the disk directory or the tape header block. For disk, we must give extra information: a prefix of "0:" to indicate if necessary that this file should be written on drive 0; and a suffix of ",S,W" to signal that this is to be a sequential type file, and it will be written, not read.

We've opened the file, but we have written no data. Let's do that.

Writing The Data

Type (carefully) the following commands:

```
PRINT#1,"SMITH";CHR$(13);  
PRINT#1,"3487";CHR$(13);  
PRINT#1,78;CHR$(13);
```

These are the three fields of a student record. Important: Do not put a space after PRINT since PRINT# must be typed as one block; and don't forget to use a semicolon at the end of each line.

The CHR\$(13) character is a RETURN character; we use it to signal the end of each field. We are better off not typing just PRINT#1,"SMITH" since an extra character called a *linefeed* might sneak its way in there and cause trouble later.

The name SMITH is a string, of course. So is the student number – even though it's numeric, we will never want to do arithmetic on it. The student mark is a genuine number, however, since we may want to compute high scores or

EPYX TOP 10 GAME SALE

*** BUY TWO — GET ONE FREE ***

SPECIAL FREE GAME

Buy Two Epyx Games From Protecto And Get A Free Game

The Thinking Man's Paradise

(Disk / Cassette)

- Award Winning Games
- Fantastic Graphics
- Skill (not luck) Needed
- Already in top 10 charts

COMMODORE - 64 / VIC-20

Buy Any Two Epyx Games From Protecto And Send The Proof Of Purchase Seals To Epyx And Epyx Will Send You A Free Game.



JUMPMAN

If you like Donkey Kong, you'll love Jumpman. Over 30 different screens with 8 speeds and 5 skill levels make this the fastest action game in the country. You must leap girders, climb ropes, and scale ladders to reach and diffuse bombs while avoiding robots, birds, bullets, explosives, crumbling walls, vanishing escape routes, and many other obstacles. (Truly a fantastic game!)

List \$39.95 Sale \$27.95

TEMPLE OF APSHA! (computer game of the year)

This is the standard by which other adventure games are judged. Full color graphics portray the temple and all its contents - magic, monsters, doomed cities and damsels in distress. Do battle in real time with over 20 monsters, expansion modules will keep your adventure alive in the future.

List \$39.95 Sale \$29.95



SWORD OF FARGOAL

Search for the wondrous sword in the depths of an ever changing dungeon. Make yourself invisible, teleport to a new location, drink a healing potion or use enchanted treasures, but watch out for traps and hideous creatures who will try to stop you. (Fantastic dungeon adventure)

List \$29.95 Sale \$21.95



CRUSH CRUMBLE & CHOMP (Computer game of the year nominee)

Choose one of six monsters or create your own, and use your monster to destroy one of four unsuspecting cities. The cities aren't totally defenseless, they call on police, national guard, and even a mad scientist, complete with helicopter, to save humanity from the relentless threat.

List \$29.95 Sale \$21.95



JUMPMAN JUNIOR

The devilish ALIENATORS are back! And they have overrun the Jupiter Command Substation. In this cartridge format sequel to the best-selling Jumpman, players must leap through 12 all new screens featuring electrocution traps, moving walls, hellstones, and dangers much too bizarre to be believed. How many screens can you master? Twelve different screens, 8 speeds.

List \$39.95 Sale \$27.95



We have all Epyx games

**PROTECTO
ENTERPRISES**

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

Fantastic Sale!

HES Special Programs For VIC-20 Computer

Call Today!!

Call Today!!

Call Today!!

SYNTHESOUND Sale \$19.95

• Fantastic Sound & Music • Piano Keyboard

Now your VIC-20 can be used as a state-of-the-art music synthesizer and special effects generator! A very user friendly manual guides you through sessions of learning and development of your synthesizer "style"! You can program Synthesound to sound like many different instruments like bagpipes, organ, bass and many others. Synthesound brings technical musical abilities to any VIC-20 user. Prepare to step into the exciting world of the futuristic computer musician.

- VIC keyboard used as a 2 octave, fast attack keyboard.
- 3 voices with 4 1/2 octave range.
- 4 low frequency oscillators.
- 4 envelope shaping controls (Attack, Decay, Sustain, Release).
- 4 voice/20 note sequencer for repeating melodies or rhythms
- High resolution piano keyboard display.



List \$44.95
Sale \$19.95

SHAMUS (No. 1 Joy Stick Action Game!) Sale \$24.95

Fight against the Roboroids and Snap Jumpers as you wind your way through the Shadows lair. Dangerous obstacles may mean your doom if you're not fast with your joy stick action! Excellent high resolution graphics and fantastic sound! VERY ADDICTIVE!



List \$39.95
Sale \$24.95

VIC FORTH LANGUAGE Sale \$39.95

Faster than BASIC — easier than Assembly language — Language of Robots.

VIC FORTH is an exciting new cartridge for your VIC-20 computer. You now have a language that is more powerful than BASIC and easier to program than assembler! VIC FORTH is a nearly complete implementation of the "FORTH INTEREST GROUP" (fig.) version of FORTH. The VIC FORTH editor follows closely the standard FORTH editor described in the book, "Starting FORTH", plus it has many, many additional features.

- Full screen editor which has 16 lines of 64 characters each (standard FORTH Screen) through use of a horizontal scrolling window.
- User definable words; this means a function not already supported can be created by you and added to VIC FORTH for future use.
- Full VIC sound and color capabilities.
- Runs in standard 5k VIC.
- Output to printers and disks and tape machines.
- Up to 24k additional memory can be added.
- 31 characters for variable names.



List \$59.95
Sale \$39.95

TURTLE GRAPHICS Sale \$29.95

• Create colorful pictures and graphics • Learn how computers compute.

Turtle Graphics is an exciting and fun way to discover computer programming concepts. Turtle Graphics is an easy-to-learn computer language. It enables the beginning programmer to master the computer in just a few minutes. By telling an imaginary turtle how to roam about on the VIC's screen, the Turtle Graphics programmer can create colorful and artistic pictures. As one becomes more and more adept at teaching the turtle to paint using the VIC's rich graphics and color palette he or she is painlessly learning all of the basics of computer programming. This not only develops computer awareness, but enriches one's math, logic, communication and artistic skills as well.

- Turtle Graphics has over 30 different commands.
- Programs may be listed on a printer and saved on or loaded from tape or disk.
- Turtle Graphics is menu driven for ease of use.
- Trace mode to help the beginning programmer follow the logic of his program one step at a time.
- Well written, easy-to-follow manual with many examples included.



List \$39.95
Sale \$29.95

We Have All HES Products At Super Sale Prices

PROTECTO
ENTERPRISES (WE LOVE OUR CUSTOMERS)
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

averages. So it's not written or read as a string (no quote marks).

I prefer printing three fields with three lines. It seems to me that they stand out better. But you can print everything in one line. For variety, let's write our second student record that way:

```
PRINT#1,"WONG";CHR$(13);"3921";CHR$(13);72;  
CHR$(13);
```

The information is harder to read, but it's all there. Remember the semicolon at the end.

One more student, and we'll wrap up our file. Again, let's use a slightly different method to show variety:

```
X$ = CHR$(13);PRINT#1,"BLOGGS" + X$ + "3985" +  
X$;77;X$;
```

We've done two things here: by setting X\$ equal to our RETURN character we've saved a little typing in the PRINT# statement; and instead of using semicolon punctuation, we've used the + sign for concatenation where we can. No real difference either way. But don't forget the semicolon at the end.

Wrapping Up

You may have noticed something odd: when you typed in each student record, there was no activity. The disk did not spin; the tape did not move. Why? Because the characters are stored in a buffer

(an area of the computer's memory) until there are enough of them to make it worthwhile writing to tape or disk.

We must close the file, or the data won't be written. So let's type:

CLOSE 1

and our file is complete. Next month, we'll see how to read it.



**TIRED OF REPETITIOUS COMPUTER GAMES?
BORED WITH WAITING FOR YOUR SHOT AT THE ALIENS?**
Enter a magical garden of strategy—a new generation of game-playing with

DOWN THE GARDEN PATH

- draw a maze of paths
- attempt the "arid dance"
- tailor all game attributes
- place and cast spells

- each game a unique creation of the player(s)
- simultaneous action against the computer or a friend
- skill levels from apprentice to arch-wizard

• MACHINE LANGUAGE • ATARI 800® 48K REQUIRED • DISK 34.95
OUTSIDE ILLINOIS 800-621-0660   **IN ILLINOIS 800-572-0440**

Illinois residents add 6% sales tax. Allow 3 weeks for personal checks.
\$3.00 shipping and handling.

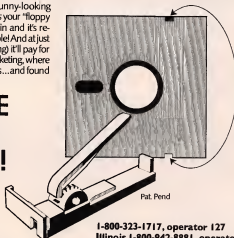
QuinTech Systems, Inc., 1271 Dundee Rd., Suite #44B, Buffalo Grove, IL 60089
* Atari 800 is a registered trademark of Atari, Inc.

THIS FUNNY-LOOKING LITTLE DEVICE

Introducing the Disc-Doubler[®], the funny-looking amazing little device that actually *doubles* your "floppy disc" capabilities! Just put a floppy disc in and it's re-aligned for use on its "flip side." It's that simple! And at just \$14.95 (plus \$1.50 for postage and handling) it'll pay for itself the minute you use it! From Link Marketing, where we looked at the problem from both sides...and found a way to save you money!

**CAN DOUBLE
YOUR DISC
CAPABILITIES!**
Just \$14.95!

(plus \$1.50 postage and handling—B.C. residents add 6% tax).



Victor
Franklin
Apple
Atari
Vic 20
Commodore 64
Pet
CBM



IN CANADA:

write: Link Marketing
1480 West 58th Avenue, Vancouver, B.C. V6P 1W5

1-800-323-1717, operator 127
Illinois 1-800-942-8881, operator 127
or write: Link Marketing
219-1st Ave. N., Suite 215, Seattle, WA 98109

Atari Disk Detective

D G Denby

A helpful disk utility for Atari owners, this program searches your disk and locates any user-specified string (hex or ASCII). It's especially useful for file recovery.

"Disk Detective" is a utility program that will appeal most to the advanced programmer, but will also prove useful to the novice. The program is designed to search through a disk, sector by sector, and find occurrences of a user-specified string of either hexadecimal or ASCII characters.

Practical Applications

Suppose you want to recover a disk file that has gone awry, but can't find all of its bytes. We know that the last byte of each sector is a pointer that tells DOS the number of sectors to jump to find the next sector of the file. Also, we know that the VTOC (Volume Table Of Contents) contains information showing DOS the way to the first sector of a file and that the VTOC is located beginning at sector 361 through sector _____. Who likes to search through an unknown number of sectors with a sector dump utility to find out where the information for "MYPROG" is given?

This program will let you specify the range of sectors to be searched and the string to be found in your choice of hex or ASCII. As an example, let's select ASCII and enter the characters for our filename, and presto - we have the sector and byte to get the information for our file. A word of caution here: DOS apparently leaves the directory entries intact after a file has been deleted. It just revises the VTOC listing to indicate that the file has been deleted (see *Inside Atari DOS* for more information). This will allow you to recover deleted files by changing the VTOC record if DOS has not written any subsequent information over the required sectors.

You can have more than one listing in the VTOC for a filename if you have made revisions and then reused the filename. Also, because DOS fills any unused characters in the first field of a filename with blanks, it is necessary to include an appropriate number of blanks when searching for a filename that uses an extender (for example, MYPROG.BAS doesn't use the "dots" found in: MYPROG.BAS). This becomes a small problem once you understand how DOS saves filenames.

Machine language programmers will probably find Disk Detective useful for finding hex strings on boot disks where they might like to make minor modifications for their own use or to look for a particular operating system call in order to see how the designers used these routines in their programs. (Note: Disk Detective allows a maximum of 20 characters in its search string.)

Suppose you want to find all calls to the resident disk handler in sectors 1-20. You would first specify this sector range in answer to the prompts, select hex, enter 20-53-E4, then hit RETURN. (For the benefit of those who aren't machine language programmers, the resident disk handler is located at (\$=hex) \$E453, and it is called by a JSR command (\$20); the 53 comes before the E4 because the CPU expects to read the low byte and then the high byte when reading or executing an object code program from disk or memory.)

Program Explanation

Lines 170-260 are concerned with translating the internal characters returned by the keyboard into their true hexadecimal values and then POKEing them into their respective locations in B5. Variables LN and HN are the low nybble and the high nybble of each byte that is to be POKed. A is a counter for the low-high nybble; B is a counter for the length of the search string.

Lines 300 through 340 serve the same function

DISK CLEANER

Everyone Needs A

Disk Drive Doctor

Sale \$19.95

FACTS

- It has been estimated that 60% of all drive downtime is directly related to poorly maintained drives.
- Drives should be cleaned each week regardless of use.
- Drives are sensitive to smoke, dust and all micro particles.
- Systematic operator performed maintenance is the best way of ensuring error free use of your computer system.

The Cheetah disk drive cleaner can be used with single or double sided 5 1/4" disk drives. The Cheetah is an easy to use fast method of maintaining efficient floppy diskette drive operation.

The Cheetah cleaner comes with 2 disks and is packed in a protective plastic folder to prevent contamination. List \$29.95 / Sale \$19.95

Features	Cheetah	3M	Discwasher	Verbatim
Cleanings Per Kit	40 +	25	30	2 original - 10 refill
Price	\$19.95	\$34.95	\$24.95	\$12.95
Abrasivity	None	Minimum	High	Moderate
Programming Required	No	No	Yes	No

Add \$3.00 for postage. Add \$6.00 for CANADA, PUERTO RICO, HAWAII orders. WE DO NOT EXPORT TO OTHER COUNTRIES

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail! Canada orders must be in U.S. dollars. We accept Visa and Master Card.

PROTECTO
ENTERPRISES (WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

FLOPPY DISKS SALE

*\$1.19 ea.

Economy Model or Cadillac Quality

We have the lowest prices!

ECONOMY DISKS

Good quality 5¼" single sided single density with hub rings.

Bulk Pac	100 Qty.	\$1.19 ea.	Total Price	\$119.00
	10 Qty.	1.39 ea.	Total Price	13.90

CADILLAC QUALITY

• Each disk certified • Free replacement lifetime warranty • Automatic dust remover

For those who want cadillac quality we have the Loran Floppy Disk. Used by professionals because they can rely on Loran Disks to store important data and programs without fear of loss! Each Loran disk is 100% certified (an exclusive process) plus each disk carries an exclusive **FREE REPLACEMENT LIFETIME WARRANTY**. With Loran disks you can have the peace of mind without the frustration of program loss after hours spent in program development.

100% CERTIFICATION TEST

Some floppy disk manufacturers only sample test on a batch basis the disks they sell, and then claim they are certified. Each Loran disk is individually checked so you will never experience data or program loss during your lifetime!

FREE REPLACEMENT LIFETIME WARRANTY

We are so sure of Loran Disks that we give you a free replacement warranty against failure to perform due to faulty materials or workmanship for as long as you own your Loran disk.

AUTOMATIC DUST REMOVER

Just like a record needle, disk drive heads must travel hundreds of miles over disk surfaces. Unlike other floppy disks the Loran smooth surface finish saves disk drive head wear during the life of the disk. (A rough surface will grind your disk drive head like sandpaper). The lint free automatic **CLEANING LINER** makes sure the disk-killers (dust & dirt) are being constantly cleaned while the disk is being operated. **PLUS** the Loran Disk has the highest probability rate of any other disk in the industry for storing and retaining data without loss for the life of the disk.

Loran is definitely the Cadillac disk in the world

Just to prove it even further, we are offering these super LOW INTRODUCTORY PRICES

List \$4.99 ea. **INTRODUCTORY SALE PRICE \$2.99 ea.** (Box of 10 only) Total price \$29.90

\$3.33 ea. (3 quantity) Total price \$9.99

All disks come with hub rings and sleeves in an attractive package.

RANKING FOR BEST PERFORMANCE

MEASUREMENTS	LORAN	Verbatim	Ultra	3M
Amplitude	1	2	3	3
Missing bit ratio (reliability)	1	3	3	2
Extra bit rate	1	2	1	3
Modulation	1	3	2	2
Running torque	1	1	1	2

(Numbers that are the same indicate a tie for that position)

LORAN beats the competition cold!!

Add \$3.00 for postage. Add \$6.00 for CANADA, PUERTO RICO, HAWAII orders. WE DO NOT EXPORT TO OTHER COUNTRIES

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail! Canada orders must be in U.S. dollars. We accept Visa and MasterCard.

PROTECTO
ENTERPRISES we love our customers!

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

only for ASCII characters and therefore need no translation.

Lines 400 through 810 set up the call for the machine language portion of the program and examine the results before writing to the screen.

Lines 1000 through 1050 reserve an area in memory for the machine language program and then POKE it into memory.

Lines 2000 through 2140 are the data for the machine language program. This, by the way, uses the resident disk handler to retrieve data from the disk sectors and put the results into A\$. It then proceeds to search through A\$ to find all occurrences of the search string and then returns to BASIC.

As you can see, this program is useful only after some experience with the machine, and it also assumes that you already have some kind of sector dump/modify utility. You will certainly find many more uses for this program than those discussed here.

Disk Detective

```

10 ? "(CLEAR)":GRAPHICS 2+16:POSITIO
N 5,3: ? #6: "PRESENTING":POSITION
3,6: ? #6: "disk detective"
20 ? #6
30 FOR I=1 TO 2000:NEXT I
40 GRAPHICS 0
90 ? "(BELL)":POKE 752,1: ? "(CLEAR)":
POSITION B,B: ? "SEARCHING FOR SECTORS"
100 CLS: DIM A$(128),B$(20),CH$(1):G
OSUB 1000:REM **LOAD ML**
105 GRAPHICS 0:POKE 752,0: ? "Be sure
to load your search disk": ? "
(BELL)":FOR I=1 TO 2000:NEXT I
110 RPAGE=ADR(B$): ? "(CLEAR)": ? "BEG
INNING SECTOR FOR SEARCH":INPUT
X:IF X<1 OR X>720 THEN 110
115 B$="(19,)"
120 POSITION 2,2: ? "ENDING SECTOR FO
R SEARCH":INPUT Y:IF Y<X OR Y>
720 THEN 120
130 POSITION 2,4: ? "INPUT STRING IN
[ ] OR [ ]":OPEN #1,4,0,"K":
135 REM ** IS IT ASCII **
140 GET #1,KB:IF KB=65 THEN 300
145 REM ** OR HEX **
150 IF KB=72 THEN 170
160 ? "(BELL)":CLOSE #1:GOTO 130
170 POSITION 2,4: ? "ENTER [ ] STRING
(19 SPACES)":A$=B$=0
180 GET #1,KB:IF KB=155 THEN 400
190 A=A+1:CH$=CHR$(KB): ? CH$:IF A=2
THEN ? "-":LN=KB:GOTO 210
200 HN=KB:GOTO 180
210 HN=HN-4B:LN=LN-4B:IF HN>9 THEN H
N=HN-7
220 IF LN>9 THEN LN=LN-7
230 HN=HN+16:BYTE=HN-LN:IF BYTE<255
THEN ? "(BELL)": ? "(BELL)": ? "[ ]
[ ]":FOR I=1 TO 600:NEXT I:GOTO
100
240 POKE RPAGE,BYTE:RPAGE=RPAGE+1:A=
0:B=B+1
250 IF B=21 THEN 400
260 GOTO 180
300 POSITION 2,4: ? "ENTER [ ] STRI
NG(17 SPACES)":B=0
310 GET #1,KB:IF KB=155 THEN 400
320 B=B+1:CH$=CHR$(KB): ? CH$: ? ":PO
KE RPAGE,KB:RPAGE=RPAGE+1
330 IF B=20 THEN 400
340 GOTO 310
400 CLOSE #1:C=128-B:POKE 207,B-1
410 BYTE=1776:IF X>Y THEN 600
420 ML=USR(ASSEM,X,ADR(A$),ADR(B$),C
)
430 IF PEEK(771)=144 THEN 700
440 IF PEEK(771)<21 THEN 800
450 IF PEEK(BYTE)<>0 THEN 500
495 X=X+1:GOTO 410
500 IF BYTE=17B1 THEN 495
503 ? ? "=>SECTOR: "X" BYTE: "Y:P
EEK(BYTE)-1
505 IF PEEK(BYTE+1)<>0 THEN BYTE=BYT
E+1:GOTO 500
510 GOTO 495
600 ? "(BELL)": ? ? "(10 SPACES):[ ]
[ ]": ? "DO YOU WANT TO INSPECT
OTHER SECTORS? (Y OR N)"
610 OPEN #1,4,0,"K": ? "GET #1,KB:CLOSE
#1:CH$=CHR$(KB)
620 IF CH$="Y" THEN 110
630 END
700 ? ? "BAD SECTOR AT "X
710 GOTO 495
800 ? ? "[ ] [ ]":PEEK(771): ? AT SEC
TOR "X
810 GOTO 495
1000 RESTORE 2000
1010 RANTOP=106:MYPG=PEEK(RANTOP)-10
1020 ASSEM=MYPG*256:ADDR=ASSEM
1030 READ B:IF B=-1 THEN RETURN
1040 POKE ADDR,B
1050 ADDR=ADDR+1:GOTO 1030
2000 DATA 104,104,141,11,3,104,141,1
0,3,104
2010 DATA 133,204,141,5,3,104,133,20
3,141
2020 DATA 4,3,104,133,206,104,133,20
5,169
2030 DATA 1,141,1,3,169,82,141,2,3,1
04,184
2040 DATA 133,224,32,83,228,173,3,3,
201,1
2050 DATA 240,1,96,141,240,6,141,254
,6,162,0
2060 DATA 142,241,6,142,242,6,142,24
3,6,142
2070 DATA 244,6,160,255,200,177,203,
209,205,240
2080 DATA 25,24,165,203,105,1,133,20
3,24,173
2090 DATA 254,6,105,1,157,240,6,141,
254,6,197
2100 DATA 224,208,224,240,38,152,197
,207,208,219
2110 DATA 224,5,240,29,232,24,165,20
3,105,1,133
2120 DATA 203,24,173,254,6,105,1,141
,254,6,24
2130 DATA 173,240,6,234,234,141,240,
6,24,144,184
2140 DATA 169,0,157,240,6,96,-1

```

64 SOUND TESTER

Ronald V. Picard

The Commodore 64's sound system surpasses the capabilities of all previous microcomputers. Before the 64, a variety of waveforms, attack/decay and sustain/release features were available only on sound synthesizers. Understanding and adjusting to the many different sounds and settings can be perplexing to both beginning and advanced programmers.

"Sound Test" allows you to experiment with these features, then listen to the results and modify the settings. You can explore up to eight octaves as well as the noise generator. At any time the data used may be displayed before exploring other settings.

When you're running the program, a listing of the current values will appear, with a cursor next to the top one. If you want to change the value on that line, you should enter the new value and then press RETURN. If you don't wish to change the value, just press RETURN.

T, S, and P refer to triangle, sawtooth, and pulse waveforms. N stands for the noise generator and Q for quit the program. Anytime you would like to see the data, enter D.

After the last value is entered, a tune will be played with the current ADSR values, after which the program will loop and repeat.

Anyone wishing a cassette copy of the program, send \$3, a cassette, and a stamped, self-addressed mailer, to:

Ronald V. Picard
T52 E. Shaw
M.S.U.
E. Lansing, MI 48825

Sound Test

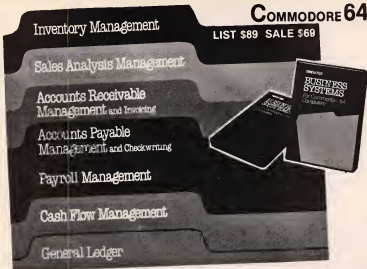
```

5 DIM SO(16,8)
10 HF=54273:LF=54272:AD=54277:SR=54278:W=
  54276:V=54296:HP=54275:LP=54274
15 FOR I=1 TO 8:A(1)=0:NEXT:W$="S"
20 FOR O=1 TO 8:FOR N=1 TO 16:READ SO(N,O):NE
  XT:NEXT
25 FOR N=1 TO 8:READ D(N):NEXT
100 PRINT"[CLEAR]";CHR$(18);"PULSE SETTING
  USED ONLY WITH PULSE WAVE";CHR$
  (146)
102 PRINT
110 PRINT"WAVEFORM (T,S,P,N) =";W$
112 PRINT"VOLUME (1-15) =";A(1)
114 PRINT"OCTAVE (1-8) =";A(2)
116 PRINT"ATTACK SETTING (0-15) =";A(3)
118 PRINT"DECAY SETTING (0-15) =";A(4)
120 PRINT"SUSTAIN SETTING (0-15) =";A(5)
122 PRINT"RELEASE SETTING (0-15) =";A(6)
124 PRINT"HIGH PULSE SETTING (0-15) =";A(7)
  )
126 PRINT"LOW PULSE SETTING (0-255) =";A(8)
  )

130 PRINT"[HOME]";"["03 DOWN]";
140 PRINTTAB(33);"?";GOSUB500:IF Z$="D"TH
  EN 600
150 IF Z$="Q" THEN PRINT"[CLEAR]";END
155 IF Z$<>CHR$(13)THEN W$=Z$
160 FORO=1 TO 8
170 PRINTTAB(33);"?";GOSUB500:IF Z$<>CHR$
  (13) THEN A(O)=VAL(Z$)
180 NEXT
190 IF W$<>"P" THEN 230
200 FORO=7 TO 8
210 PRINTTAB(33);"?";GOSUB500:IF Z$<>CHR$
  (13) THEN A(O)=VAL(Z$)
220 NEXT
230 POKEV,A(1)
240 POKEAD,16*A(3)+A(4):POKESR,16*A(5)+A(6)
  )
250 IF W$="T" THEN POKE W,17
260 IF W$="S" THEN POKE W,33
270 IF W$="P" THEN POKE W,65:POKEHP,A(7):P
  OKELP,A(8)
280 IF W$="N" THEN POKE W,129
300 O=0
310 FOR I=1 TO 15 STEP 2:POKEHP,SO(I,A(2)):POK
  ELF,SO(I+1,A(2)):O=O+1:FORN=1 TO D(I
  )
311 NEXT
315 POKEHP,0:POKELP,0:NEXT:POKEW,0:POKEAD,
  0:POKESR,0:POKEHP,0:POKELP,0
320 GOTO100
500 Z$=""
510 GETY$:PRINTCHR$(18);"?";CHR$(146);:FOR
  I=1 TO 25:NEXT:PRINTCHR$(157);"?";
515 PRINTCHR$(157);:FORI=1 TO 25:NEXT:IFY$="
  "THEN510
520 PRINTY$;
530 IF Y$=CHR$(13) THENIF LEN(Z$)=0 THENZ$
  =CHR$(13)
540 IF Y$=CHR$(13) THEN RETURN
550 Z$=Z$+Y$:GOTO510
600 PRINT"[CLEAR]"
610 PRINT:PRINT"ATTACK/DECAY =";16*A(3)
  +A(4)
620 PRINT"SUSTAIN/RELEASE =";16*A(5)+A(6)
630 PRINT:PRINT:PRINT"HIT ANY KEY TO CONTI
  NUE";
640 GETY$:IFY$=" "THEN640
650 GOTO100
1000 DATA 1,155,1,90,1,110,1,155,1,90,1,110
  ,1,155,1,205
1010 DATA 3,54,2,179,2,220,3,54,2,179,2,220
  ,3,54,3,155
1020 DATA 6,108,5,103,5,185,6,108,5,103,5,1
  85,6,108,7,53
1030 DATA 12,216,10,205,11,114,12,216,10,20
  5,11,114,12,216,14,107
1040 DATA 25,177,21,154,22,227,25,177,21,15
  4,22,227,25,177,28,214
1050 DATA 51,97,43,52,45,198,51,97,43,52,45
  ,198,51,97,57,172
1060 DATA 102,194,86,105,91,140,102,194,86,
  105,91,140,102,194,115,88
1070 DATA 205,133,172,210,183,25,205,133,17
  2,210,183,25,205,133,230,176
1080 DATA 500,250,250,250,250,250,250,1000
  )

```

PROFESSIONAL BUSINESS SOFTWARE SALE!



Executive Quality by **TIMEWORKS**
"Cadillac of Business Programs"

Each Program comes in a beautiful case and includes: Disk

- A Menu-driven program, sophisticated enough to provide complete Management and Product information, yet requires no prior computer or accounting knowledge to operate.
- A Manual written in easy-to-understand, people-friendly English, abundantly illustrated to provide further clarity and eliminate guesswork.
- A unique method of creating your own, unlimited array of reports—easily and quickly. YOU select the information you want, and YOU determine the sequence of the report column headings.
- Password Protection, to prevent unauthorized access to confidential data.
- A program which can be used by itself (stand-alone), or can be interfaced, one at a time, with other TIMEWORKS MANAGEMENT INFORMATION programs into a fully integrated accounting system.

PLUS: THESE PROFESSIONAL BUSINESS PROGRAMS -

- | | |
|---|-----------------------|
| • Script 64 - No. 1 Executive Word Processor - Disk | List \$99 - Sale \$59 |
| • Complete Data Base - Tape-Disk | List \$89 - Sale \$59 |
| • Electronic Spread Sheet (like Visicalc) - Tape-Disk | List \$89 - Sale \$59 |

• LOWEST PRICES • 15 DAY FREE TRIAL • 90 DAY FREE REPLACEMENT WARRANTY
• BEST SERVICE IN U.S.A. • ONE DAY EXPRESS MAIL • OVER 500 PROGRAMS • FREE CATALOGS

Add \$3.00 for postage. Add \$6.00 for CANADA, PUERTO RICO, HAWAII orders. WE DO NOT EXPORT TO OTHER COUNTRIES.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail. Canada orders must be in U.S. dollars. We accept Visa and MasterCard.

PROTECTO
ENTERPRISES (WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

COMMODORE 64 PROFESSIONAL BUSINESS PROGRAMS



- INTRODUCTORY OFFER 1/2 PRICE!
- 15 DAY FREE TRIAL!
- LIFETIME GUARANTEE!
- FILE GUARD (TM)

PROFESSIONAL BUSINESS PROGRAMS! Disk)

You take no risk! We are so sure these professional business programs will meet and exceed your highest expectations, we are willing to allow you to try these programs at our expense! These are designed and produced by **Southern Solutions** who produces professional business programs for Commodore's most expensive computers. These business programs will convert your Commodore 64 into a Professional Business Machine!!!

INTRODUCTORY OFFER! (Expires 12-25-83)

	List	1/2 Price
• General Ledger & Cash Flow	\$119.00	\$59.00
• Accounts Payable Plus Check Writing	\$119.00	\$59.00
• Accounts Receivable	\$119.00	\$59.00
• Payroll	\$119.00	\$59.00
• Inventory	\$119.00	\$59.00
• Data Base Manager	\$119.00	\$59.00

15 DAY FREE TRIAL!

We give you 15 days at your business for you to try out these programs! Should they not meet your requirements just send them back prepaid and we'll refund your purchase price!

LIFETIME GUARANTEE!

If a program fails due to faulty workmanship or material anytime you personally own and use the program we will replace it at no charge!

FILE GUARD (TM)

Prevents loss of data and confidential files due to power failure — a Southern Solutions exclusive!

PLUS: THESE PROFESSIONAL BUSINESS PROGRAMS -

- **Script 64 - No. 1 Executive Word Processor - Disk** List \$99 - Sale \$59
- **Complete Data Base - Tape-Disk** List \$89 - Sale \$59
- **Electronic Spread Sheet (like Visicalc) - Tape-Disk** List \$89 - Sale \$59

• LOWEST PRICES • 15 DAY FREE TRIAL • 90 DAY FREE REPLACEMENT WARRANTY
• BEST SERVICE IN U.S.A. • ONE DAY EXPRESS MAIL • OVER 500 PROGRAMS • FREE CATALOGS

Add \$3.00 for postage. Add \$6.00 for CANADA, PUERTO RICO, HAWAII orders. WE DO NOT EXPORT TO OTHER COUNTRIES

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail! Canada orders must be in U.S. dollars. We accept Visa and MasterCard. We ship C.O.D.

PROTECTO
ENTERPRISES (WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order



TROJANTM

VIC-20

SUPER GRAPHICS GAME SALE



- Fast Action • Complex Strategies • Superior Sound Effects • Multiple Levels of Play
- Nationally Advertiser — Top 10 Contenders!



Attack Crazy Aliens! - TAPE
Galactic Blitz—the video sport where the aliens have 15 different play patterns and refuse to be taken out of the game! If you are merely spectators find another sport. Written in 100% Machine Code. List \$24.95 Sale **\$16.95**



Dive Into A Frenzied Fight! - TAPE
Think of all the space warriors anxious to whoosh into the most frenzied fight the far side of the galaxy's ever endured! They'll find it in Sidewinder—an incredibly fast and challenging game where players out-manuever deadly Battle pods, dodge destructive Stalker bombs and go head-to-head with alien Oblitojets. Written in 100% Machine Code, with ten explosive battle levels. List \$29.95 Sale **\$19.95**



Blast An Insect Invasion! - TAPE
Dive into the most awesome all-out battle ever! In Swarm!, battle a barrage of deadly Android wasps and creatures never encountered before! The searing sound effects and fantastic speeds put Swarm! sons ahead of any space game for the VIC-20. 40 Levels. Written in 100% Machine Code. List \$29.95 Sale **\$19.95**



By Jimmy Huey
In a predatory world of killer worms, dragons, stalkers, pods and fly traps, the scorpion prowls the maze in search of sustenance. Frogs and their eggs mean survival to the scorpion. But they can also mean instant death! - **CARTRIDGE**

List \$39.95 Sale **\$26.95**



By Thomas Kim
Your helicopter gunship hovers over the enemy's military bases and missile emplacements. Your mission is to destroy them. But as the sky fills with smart bombs and anti-aircraft fire, there's less and less room for a wrong move! - **CARTRIDGE**

List \$39.95 Sale **\$26.95**



By Corey Casman
Deep in the earth, a fortune awaits. But the dark passageways are filled with peril as well as profit. Runaway boxcars. Crashing boulders. A claim jumper with murder in his eyes. Be careful! But be quick—oxygen is in short supply! - **CARTRIDGE**

List \$39.95 Sale **\$26.95**

Add \$3.00 for postage. Add \$6.00 for CANADA, PUERTO RICO, HAWAII orders. WE DO NOT EXPORT TO OTHER COUNTRIES.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery. 2 to 7 days for phone orders, 1 day express mail! Canada orders must be in U.S. dollars. We accept Visa and MasterCard. We ship C.O.D.

PROTECTO ENTERPRIZES

(WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

How To Improve The TV Quality Of The Commodore 64

Jim Butterfield, Associate Editor

If you own a 1701 Video Monitor, you may not be getting maximum video quality. Here's an alternative hookup that produces a remarkable picture. Even if you don't use a 1701, you can still use some of these ideas to improve your computer's picture quality on a TV or monitor.

The Commodore 1701 Video Monitor is an attractive 13-inch color monitor with good color definition and good sound. But most Commodore 64 users miss a bet: they hook it up via the front connections.

There seems to be a rumor that you can't use the connections at the back unless you have an 8-pin video connector. Not true - you can get a magnificent picture from the traditional 5-pin interface.

Inside A Monitor

There are two parts to a video signal: the brightness and the color. Most monitors mix them together to produce a "composite" video signal. Inside a monitor - or television set - the two signals must be split apart once again before they can be used.

The color (or *chrominance*) signal is carefully designed so that it can be mixed in with the brightness (or *luminance*) and later separated. The system isn't perfect, however, and there's always a trace of the color signal left in the screen brightness.

Traces of the chrominance signal left in the

brightness can cause viewing trouble. Depending on the foreground and background colors, a finely checkered pattern can appear on the screen. To make matters worse, this pattern interferes with the normal pixel resolution of the screen, and every second character on the screen will look smeared.

For some colors, this isn't a problem. Other color combinations look bad. But the whole problem can be solved by not mixing chrominance and luminance; instead, deliver them on separate wires to the monitor.

By the way, there's another method used to deliver signals to video monitors. It's called RGB, for Red/Green/Blue; it uses three signal wires, one for each color. However, this method is not available for use with the Commodore 64.

Hooking It Up

There are two different video signals available on the 5-pin DIN connector on the 64. The signal on pin 4 is called *Video Out*: it's a composite video signal containing both luminance and chrominance. On pin 1, we'll find the luminance signal: a sharp, black-and-white signal with no color component. If you connect pin 1 to the 1701's luminance connection, and pin 4 to the nearby chrominance connection (they are both on the back of the monitor), you'll get a picture of marvelous quality.

I'm amazed to find that the necessary cable doesn't come in the box with the monitor. The

VIC-20 & COMMODORE-64

NEW!

\$12⁹⁵

AND UP

**ARCADE ACTION
VIDEO GAMES**

Cassette \$12⁹⁵

Diskette \$16⁹⁵

AZTEC CHALLENGE



VIC-20

You are a member of the powerful Aztec tribe. To avoid sacrificing yourself to the gods, you must compete in and complete the deadly AZTEC-OBSTACLE-COURSE. Seven phases with increasing levels of difficulty make this course challeng-

ing and keep you going for yours. Tape — List \$16.95. Sale \$12.95. Disk — List \$21.95. Sale \$16.95.

SPIDER INVASION



VIC-20

While exploring underground caverns, you uncover a plot by mutant spiders to take over the world. Only your laser beam can destroy the spiders. Destroy the spiders, their rapidly hatching eggs, and finally the nest and the giant

mother spider. Tape — List \$16.95. Sale \$12.95. Disk — List \$21.95. Sale \$16.95.

SLINKY



VIC-20

(Better than Q-BERT.) In this super fantastic arcade action game you, as SLINKY must change all the blocks on the pyramids to your color. To stop you there is Dusty the dust cloud, Marge the magnificent magnet, Randy the raindrop, Claud the

falling face, Lorenzo the chameleon cube popper, not to mention disappearing cubes and color changing cubes. 99 levels of challenging play. Highly Recommended!! Tape — List \$16.95. Sale \$12.95. Disk — List \$21.95. Sale \$16.95.

FORBIDDEN FOREST



COMMODORE 64

Only your skill as an archer can protect you! Giant spiders, an enormous bumble bee, huge leaping frogs, a fire breathing dragon, a phantom protected by killer skeletons, an 80 foot snake and finally the ghost demo gorgon who only ap-

pears in lightning flashes. All in stunning 3-D graphics! Tape — List \$16.95. Sale \$12.95. Disk — List \$21.95. Sale \$16.95.

GAMES WORTH PLAYING

COSMI



Add \$3.00 for postage. Add \$6.00 for CANADA, PUERTO RICO, HAWAII orders. WE DO NOT EXPORT TO OTHER COUNTRIES

Enclose Cashiers Check, Money Order or Personal Check Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail! Canada orders must be in U.S. dollars. We accept Visa and MasterCard. We ship C.O.D.

**PROTECTO
ENTERPRISES** (WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

VIC-20



BIG-6 CHRISTMAS SALE 40% to 60% off list

- FANTASTIC GRAPHICS • COMPLEX STRATEGIES • FAST ACTION
- CADILLAC QUALITY • OLDEST VIC-20 SOFTWARE COMPANY

Now you can get the top 6 selling UMI Arcade Action Games for your VIC-20.



Super Amok
(Better than Berserk)
Destroy the robots before they get you. Increasingly difficult mazes contact with saws, robots or valls spell death.
List \$39.95
Sale \$19.95



Video Vermin
(Like Centipede)
Hit the beetles and other creatures before they descend on you.
List \$39.95
Sale \$19.95



Renaissance
(Fantastic Game)
The age old game at its best. Change moves. Review moves and calculate strategies.
List \$39.95
Sale \$19.95



Cloudburst
(Better than Galaxian)
Shoot left, right, and up to destroy the cloud hoppers and acid rain.
List \$39.95
Sale \$15.95



Satellites & Meteorites
(Like Asteroids)
Blast Meteorites and orbiting satellites that fire back. Watch out for the Black Hole.
List \$39.95
Sale \$19.95



Outworld
(Great Graphics)
Protect your city from meteorites and bomb dropping saucers. Protect your supply ship.
List \$39.95
Sale \$19.95

Add \$3.00 for postage. Add \$6.00 for CANADA, PUERTO RICO, HAWAII orders. WE DO NOT EXPORT TO OTHER COUNTRIES

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail! Canada orders must be in U.S. dollars. We accept Visa and MasterCard. We ship C.O.D.

PROTECTO ENTERPRIZES

(WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

connector that comes with the monitor is wired for the front connection. This is fine for both the VIC and the 64, but the 64 can do far better on the rear connection. At the present time, the cable isn't provided; you'll have to wire one up or buy one.

If you'd rather not wire your own cables, you can buy a general-purpose "octopus" connector that brings out all five pins to differently colored plugs. The color codes don't seem to be universally consistent, but on the ones I tried, the most common arrangement seemed to be: red for luminance, white for chrominance (video out), and black for audio. Remember—throw the little switch at the back of the monitor to energize the back connections.

How is it that we can use a composite video signal as chrominance? Because the chrominance connection throws out any luminance that may be mixed into the signal.

Sharpness

Let's talk for a moment about why the picture is so sharp on a properly hooked-up monitor. It has to do with two aspects of television standards.

First, the color signal is "modulated," or coded, using a high frequency signal at slightly over 3.58 megacycles per second. That's a TV standard; it was designed long ago so that we could decode the color signal and separate it from the brightness. If we didn't take out the color signal (and we can never remove it completely), we would get a pattern of fine dots on the screen. These dots would not be too noticeable on a conventional television picture, but would interfere with our perception of computer characters.

Second, television color has been carefully designed to be less sharp than the black-and-white part of the picture. It turns out we can't detect color sharpness as accurately as black-and-white; so the television engineers deliberately take out the sharp color edges to allow them to design the television signal more efficiently. The technical term for this, by the way, is *lower bandwidth*.


So the sharpness is always in the black-and-white, or luminance, part of the signal. And the chrominance signal is not only less sharp, but also contains an extra frequency that will degrade the picture. No wonder we would prefer not to mix them.

The strange interrelationship of sharpness and color leads to another odd thing. If you ever draw high-resolution pictures on the 64, you are advised to make lines at least two pixels wide. Why? Because extremely thin, sharp lines get partly mixed into the color signal, and you'll get a slight but annoying "color smear" on these lines. But it won't happen on a rear-connected 1701 monitor.

If You Don't Have A 1701...

Even if you don't have the 1701 monitor, you can make use of the information on how the video signal works.

If you have a conventional color monitor, or just a color TV set, you can try for a sharper picture. The objective here is to put more luminance into the video signal. We do this by making a connection between pin 1 and pin 4 on the video connector of the 64. If you have a monitor, you can connect the two pins within the cable. If you have a TV set, you must make up a video plug with the two pins strapped together; even though the signal doesn't go out through this connector, the balance between luminance and chrominance will change. In either case, you'll need to readjust the color controls to get a satisfactory picture; and you might not even like the results. If you'd rather not do your own cabling or soldering, have your local computer or TV service store do the job for you.

You can also make a significant improvement on a black-and-white monitor, which you might use for such things as word processing or financial calculations where color doesn't matter. Now that you know about pin 1, which contains the luminance signal only, you can use it for a crisp black-and-white picture. 

VIC 20[®] 37K

Now you can have the memory power of
the 64, flexible memory control, expansion
port and more.

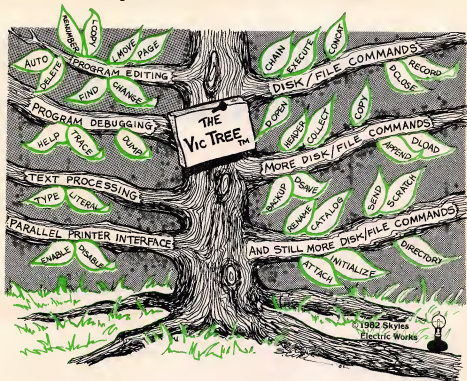
RAMMASTER 32
\$129.95

MOSAIC[®]
ELECTRONICS, INC.

Call for your nearest Mosaic Dealer
1-800-547-2807, In Oregon 653-7885

VIC 20 is a registered trademark of Commodore Business Machines, Inc.

Skyles Electric Works Presents



The VicTree™

- ...Leaves your new Commodore 64 (or Vic 20) with 42 additional commands.
- ...Branches out to most BASIC 4.0 programs.
- ...Roots into most printers.

New from Skyles: the VicTree, a coordinated hardware and software cartridge that allows your Commodore 64 to branch out in unbelievable directions and makes it easier than ever to do BASIC programming, debugging and to access your disk. And the new VicTree provides routines to interface the Commodore 64 to all Centronics Parallel printers with an inexpensive cable. 8kb of ROM—4kb for the BASIC commands, 4kb for disk commands. Perfect not only for the new Commodore 64 but also for the Vic 20. Unbelievably simple to use with a 100+ page manual with many many program examples. Easy to install, plugs into cartridge port, the VicTree gives you all the additional BASIC 4.0 commands to allow most BASIC 4.0 programs to work on your new Commodore 64 and Vic 20.

And now with the BASIC command Commodore forgot!

Now only \$89.95 or \$109.95 complete with Centronics standard printer cable. (Cable alone \$29.95.) Available now from your local dealer or order through your Visa or MasterCard toll free: (800) 227-9998 (California, Canada, Alaska, Hawaii: (415) 965-1735) or send check or money order directly to:



Skyles Electric Works

231E South Whisman Road
Mountain View, CA 94041
(415) 965-1735

String Arrays In Atari BASIC

Stephen Levy

This tutorial demonstrates an easy way to create string arrays in Atari BASIC. The author provides example programs and also includes a few handy ideas you can use with other programs.'

If you want string arrays on your Atari computer, you'll just have to purchase Atari's Microsoft BASIC disk. A common belief, but not entirely true. Although string arrays are more easily handled with Microsoft BASIC, they can be created with Atari BASIC.

Creating The Array

What we actually create here is a long string which will hold all the elements of the array. So that the array will not contain any garbage, we must clean it out before using it.

There are two ways to accomplish this. You could simply DIMension a string to 1000 and then fill it with " " using a FOR-NEXT loop.

```
90 DIM B$(1000)
100 FOR A=1 TO 1000
110 B$(A,A)=" "
120 NEXT A
130 PRINT B$
```

Here's another way to do the same thing a little differently and much more efficiently:

```
100 DIM B$(1000)
110 B$=" ":B$(1000)=" ":B$(2)=B$
120 PRINT B$
```

A lot faster, isn't it? You can use this method whenever you want to fill a large string with the same character. This is exactly what we must do to begin creating our string array. But with this next program, we need to fill the string with blanks.

Type in and RUN the following program. When you are asked for names, enter the names

of ten friends, pressing RETURN after each. As written the program will allow only names with up to ten letters.

```
100 DIM ARRAY$(100),ELEMENT$(10):PRINT CHR$(125)
110 ARRAY$=" ":ARRAY$(100)=" ":ARRAY$(2)=ARRAY$
120 FOR A=1 TO 10
130 PRINT "NAME FOR ARRAY$("";A;" ) PLEASE";:INPUT ELEMENT$
140 ARRAY$(A*10-9,A*10)=ELEMENT$
150 ELEMENT$=" ":NEXT A
160 PRINT
200 FOR A=1 TO 10
210 PRINT "ARRAY$("";A;" ) IS ";ARRAY$(A*10-9,A*10):NEXT A
300 TRAP 340
310 PRINT :PRINT "GIVE THE NUMBER (1 TO 10)"
320 PRINT "OF THE ARRAY YOU WISH TO SEE";:INPUT A
330 PRINT ARRAY$(A*10-9,A*10):GOTO 310
340 PRINT CHR$(255):GOTO 300
```

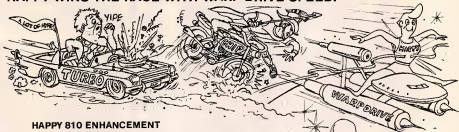
Notice that the program sets up an array with ten elements and allows you to pick from any of the ten.

How It Works

Line 100 DIMensions the array and clears the screen. Line 110 fills the array with blanks and line 120 establishes a loop so you can enter ten names. Line 130 gets your input.

Line 140 is the heart of the creation of the array. Within the parentheses the computer is told what *part* of the string should hold your input string ELEMENT\$. The first time through, A=1; therefore, ARRAY\$(A*10-9,A*10) will mean ARRAY\$(1,10) or the first ten positions in the string. When A = 2, we place ELEMENT\$ in the eleventh to twentieth positions (2*10-9 = 11 and 2*10=20). This continues until the string is full.

HAPPY WINS THE RACE WITH WARP DRIVE SPEED!



HAPPY 810 ENHANCEMENT

- The only change needed to run all WARP DRIVE software
- Plug in P.C. board requires no permanent modifications
- Proven reliable in thousands of installations, reduces disk drive wear
- Comes completely assembled and tested, just plug in and use
- Full one year parts and labor guarantee, compatible with existing software
- High quality printed circuit board with gold connectors

NO ONE ELSE HAS THIS PERFORMANCE

Unenhanced whole disk (ATARI rev B format) read time: 112 seconds
Unenhanced whole disk (ATARI rev C fast format) read time: 89 seconds
ENHANCED 810 whole disk (any format) read time with standard software: 68 seconds
ENHANCED 810 whole disk (any format) read time with WARP DRIVE software: 43 seconds
Standard software whole disk write and verify time: 238 seconds
WARP DRIVE software whole disk write and verify time: 62 seconds

NEW HAPPY WARP DRIVE SOFTWARE

WARP SPEED HAPPY BACKUP PROGRAM

- Completely automatic: nothing to figure out, insert disks and press return
- Only program on the market guaranteed to backup any disk
- Can write to a blank disk format write and verify in one operation
- Automatic program tracing: copies only the tracks that are used
- Efficient memory utilization: reduces the number of disk insertions
- Requires only one ENHANCED disk drive, backups will work on a standard drive

WARP SPEED MULTI DRIVE HAPPY BACKUP PROGRAM

- Same features as above plus support of multiple ENHANCED drives
- Can be used with up to 4 ENHANCED drives
- Source and all destination drives read and write in parallel
- Format write and verify 3 complete disks in less than 3 minutes

WARP SPEED HAPPY COMPACTOR PROGRAM

- Reduces the number of disks required to backup your library
- Combines up to 8 self booting disks into 1 disk with a menu
- Compacted disks run only on an ENHANCED drive
- Pays for itself by saving on disks
- Single or dual ENHANCED drive operation

HAPPY WARP DRIVE DOS

- Improves ATARI DOS 2.0S to use warp speed reading and write with verify
- Use all features of BASIC, PILOT, FMS, and DUP at top warp speed
- Warp speed I/O software module available separate from DOS

HAPPY WARP DRIVE SECTOR COPY PROGRAM

- Standard format whole disk read, write and verify in 105 seconds
- Use with single or dual drives, mix ENHANCED and NON-ENHANCED drives

HAPPY CUSTOMIZER PROGRAM (sold separately \$99.95)

- Creates custom format disks of any specification
- Any type bad sector, duplicate sector numbers, or interleave
- Easy to use but requires an advanced level user to interpret the results

REVIEWED IN POPULAR MAGAZINES

ANALOG COMPUTING—July/August 1983 "The installation instructions for the Happy 810 Enhancement are among the best I have ever seen...The Happy 810 Enhancement is one of the most powerful hardware modifications available to ATARI computer owners."

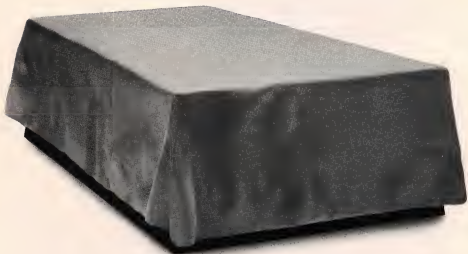
ANTIC—July 1983 "The difference between a normal ATARI 810 disk drive and one equipped with Happy is like the contrast between mass transit and the automobile. A car costs you more initially, but improves the quality of your life. Similarly, if you use your disk drive a lot, installing Happy will markedly enhance your programming life."

SPECIAL SUGGESTED RETAIL PRICE BEFORE DECEMBER 31, 1983: Get the HAPPY 810 ENHANCEMENT with the single and multi drive HAPPY BACKUP PROGRAM plus the HAPPY COMPACTOR PROGRAM plus the HAPPY DRIVE DOS, plus the HAPPY SECTOR COPY, all with WARP DRIVE speed, including our diagnostic for \$249.95. Extra registered ENHANCEMENT owners may upgrade to WARP DRIVE speed for \$15.00 with no hardware changes! Price includes shipping by air mail to U.S.A. and Canada. Foreign order adds \$10.00 and send an international money order payable through a U.S.A. bank. California orders add \$16.25 state sales tax. Cashiers check or money order for immediate shipment from stock. Personal checks require 2-3 weeks to clear. Cash COD available by phone order and charges will be added. No credit card orders accepted. ENHANCEMENTS for other ATARI compatible drives coming soon, call for information. Please specify H-model for all drives purchased new after February 1982, call for help in ENHANCEMENT model selection. Dealers now throughout the world, call for the number of the dealer closest to you.

ATARI 810 is a registered trademark of Atari, Inc.

HAPPY COMPUTING • P.O. Box 32331 • San Jose, California 95152 • (408) 251-6603

Looks like a Drives like a Parks like a



For additional information, call 1-800-334-4387. In California, call 1-800-544-4387.

© 1983 Indus Systems, 9304 Deering Avenue, Chatsworth, CA 91311. Indus GT is a product of Indus Systems. Apple II, Apple IIe and Apple III are registered trademarks of Apple Computer, Inc. Atari is a registered trademark of Atari, Inc.

Ferrari. Rolls. Beetle.

Introducing the all-new 1984 Indus GT™ disk drive. The most advanced, most complete, most handsome disk drive in the world.

A flick of its "Power" switch can turn an Atari into a Ferrari.

Or an Apple into a Red Hot Apple.

Ask your favorite computer dealer to unveil the remarkable Indus GT for you. Test drive it. Then, get ready to drive home a world-class driving machine.

Looks Like a Ferrari.

The Indus GT is incredibly sleek. Only 2.65" high! Its smoked-glass dust-cover front-loading front-end width is a perfectly proportioned 6.27." Eye-catching. Distinctively European-Gran styled.

Touch its LED-lit CommandPost™ function controls. Lay a finger on its AccuTouch™ buttons. Feel its elegant, fluid form.

Admire its smooth, sculptured, masculine lines. Wonder at its ingenious slimline engineering.

Marvel at how responsive it makes every Atari or Apple home computer.

Drives Like a Rolls.

Nestled into its soundproofed 10.4" length chassis is the quietest and most powerful disk drive power system money can buy. At top speed (which it can handle all day long), it's virtually unheard of. Whisper quiet.

Flat out, the GT will drive your Atari track-to-track 0-39 in *less than one second!*

Increasing data transfer an incredible 400%.

Built-in, low-friction GT CruiseControl metal band head-positioning assures Apple and Atari owners of trouble-free performance. So you can finish every project you enter.

And quietly tucked into every 1984 Indus GT disk drive is the exclusive GT DrivingSystem™ of software programs (included as standard equipment):

The GT DrivingSystem allows you to shift smoothly into world-class word processing with the GT Estate WordProcessor™. And your dealer will describe the two additional new GT Driving System programs that allow you to advance your driving skills. Instantly. Smoothly. Easily.

The Indus GT and GT DrivingSystem are covered with the GT PortaCase™. Which doubles as a 20-disk storage file when you're at home. Or as a portable case to flaunt your good taste and judgement when you travel. Safely. Smartly.

Parks Like a Beetle.

And it's sticker-priced like a Beetle, too. \$449 for Atari. \$329 for Apple.

The all-new, 1984 Indus GT.

Its small size makes it easy to park. And its low price makes it easy to buy.

So see and test drive the GT at your nearest computer dealer today.

The drive will be well worth it.



 **INDUS GT™**

The all-new 1984 Indus GT Disk Drive.


The cover comes off at your computer dealer's showroom.

Line 210 does the same thing, but in reverse order: it reads ARRAYS and prints the proper part to the screen. Line 330 does the same thing, but only for the part of the string you request.

Try this: RUN the program and enter any ten names. Then press BREAK. Type PRINT ARRAYS without a line number, press RETURN, and see what happens.

Now RUN the program again, but simply press RETURN without entering anything for the names. Although there appears to be nothing in ARRAYS, it is actually filled with blanks. Type PRINT ARRAYS again and see what happens.

There are also a few other techniques here which may be helpful. Lines 300 and 340 prevent the program from crashing when an incorrect INPUT is entered. TRAP 340 sends the program to line 340 instead of printing ERROR 8 LINE 320 when you enter a Q (or whatever) instead of a required number between one and ten. PRINT CHR\$(253) rings the buzzer, just as PRINT CHR\$(125) in line 100 clears the screen.

With these techniques, you now should be able to use string arrays in your own programs. 

COMPUTE! Books

OAK COMPUTER FURNITURE



**DISTINCTIVE COMPUTER FURNITURE.
FACTORY DIRECT.
UNCONDITIONALLY GUARANTEED.**

All the peripherals you can buy, won't help the productivity of your computer system if you don't have an organized way to utilize them. System VII Furniture gives you an efficient, comfortable workspace. With the warmth and beauty of hand-rubbed Oak

and the affordability of factory-direct delivery. Write us, or call our toll-free number to order a full-color catalog

SYSTEM VII FURNITURE

CALL 1-800-547-8888
P.O. Box 427 • Lafayette, Oregon 97127

the SOFTWARE connection

SUPER SAVERS

apple ATARI

Zaxxon	27.00	Serpentine (d/c)	22.00
Frogger	23.00	Labyrinth (d/c)	19.00
Serpentine	22.00	The Home Accountant (d/c)	24.00
Sea Fox	47.00	Master Type (d)	29.00
Bank Street Writer	47.95	Necromancer (d/c)	24.95
Algebra I	29.00	Spelling Bee Games (d)	29.00
Know Your Apple	24.95	Frogger (d/c)	24.95
Type Attack	29.00	Jump Man (d/c)	29.00
R. H. Super Fan	55.00	Night Strike (Rom)	32.00
TG Joylick	43.00	Droids (Rom)	32.00
TG Select-a-port	43.00	TG Enjoylick	29.00

Buy a TG Product and get a T-shirt free (while supplies last)

CALL TOLL FREE 1-800-828-2838

(For Placing Orders
Outside California)

For Inside California and Other Inquiries Call 1-916-989-3174

MAL ORDERS: For fast delivery send certified check, money order, or Visa or MasterCard number and expiration date for total purchase price plus 1% or \$2 minimum for postage and handling. Add \$5 for shipment outside the continental U.S. California Residents add 6% sales tax.

Subject to stock on hand. Prices subject to change.

Catalog free with any order or send \$2 postage and handling and please specify computer type.

THE SOFTWARE CONNECTION
5433 VISTA DEL ORO WAY
FAIR OAKS, CA 95628

SLASH YOUR FUEL BILLS

Shelter Software's
HOME ENERGY OPTI-MISER™

- Finds the best ways for you to save energy—and money
- Tells how much you'll save by switching to solar heat or other fuels
- Makes specific, accurate recommendations keyed to your home
- Easy to use
- For homes anywhere in North America

YOU COULD SAVE HUNDREDS OF DOLLARS EVERY WINTER

For Atari 400/500® (5.25" mm) or Apple II® (8" 5.25" mm)

Disk, workbook. Delivery in 4-6 weeks
\$39.50 (PA residents add \$2.37 tax)

Shelter Software™
Box 521 Dept. C
Emmenau PA 18049

SOFTWARE THAT PAYS FOR ITSELF™

*Apple II™ Apple Computers, Inc. 11 Apple Ave. 400-505 • Atari, Inc. 111

Apple Sounds — From Beeps To Music

Part 2

Blaine Mathieu

In the conclusion of this two-part series, the author combines the ideas and programs from Part 1 and presents the "Apple Music Writer." An effective tool for composing or reproducing songs, this utility is also easy to use because of its great variety of commands. There's a thorough discussion of how to use each command.

"Apple Music Writer" is a program which will allow any Apple owner to easily reproduce his or her favorite songs. When you run the program, the first thing you'll notice is the title, and then you'll hear part of a tune that you may recognize. After the tune stops, you will be prompted by the word **COMMAND?** and a flashing cursor. At the top of the screen you should see a list of the possible commands and corresponding letters. On the right side of your screen you should see a list of note names with corresponding values.

It's important that you understand and know how to use the commands, so let's review them in some detail, in the order that they appear on the screen. These commands are usable only from the **COMMAND?** mode; you must also **RETURN** after each command. You may want to experiment with them as we go along.

The Commands

A = ADDNOTE. This command will let you begin your music file (song) and keep adding to it. Every time you press **A** (and **RETURN**) you will be prompted to enter the note, a comma, and the duration. For example:

```
NOTE#1  
NOTE,DURATION:128,200
```

The maximum note value is 255 (actually 0 = 256). The same is true for the duration value. After you've entered your values, you will hear what the new note will sound like in the song.

E = EDIT. If you've made a mistake, you can fix it by typing **E** (and, as always, **RETURN**). You

will then be asked the number of the note you want to edit. If the note you want to edit is not part of the music file, you will be reprompted for the note number. If you entered a valid note number, you will be given the old values for that note and prompted for new values. The same rules apply for entering data as in **ADDNOTE**. Let's say you want to edit note number one and replace the old values with new ones of 64 and 200:

```
COMMAND? E  
EDIT NOTE#1  
NOTE#1 OLD: NOTE = 128 DUR = 200  
NOTE,DURATION: 64,200
```

P = PLAY. Typing **P** will put you into Play mode. This will play your song and print it to the screen at the same time. Because it is both listing and playing your music file, the playing will not be at the same speed as in your program. It will be slower and more pronounced. After entering **P** you will be prompted for the starting and ending note to Play/list. If you just press **RETURN** instead of entering values, the whole song will be played (defaults will be set; **D** is the default).

S = SAVE. This command will **SAVE** your music file to disk. First you will be prompted for a filename, which will be the name used when the file is **SAVED**. Then you'll be prompted for the number of the first and last note of your file that you want saved to disk. The next question is **FOR FUTURE ADDITION?** A little explanation is in order here. There are two types of files which can be produced with this command. If you answer **Y** to the above question, a file will be created that can be reloaded into Apple Music Writer at any time. You should use this option if you feel you may want to add more notes or edit your song at a later date. If you enter **N**, a file will be created that you can easily turn into a **BASIC** program that will play your song when run.

If you answer the **FUTURE ADDITION?** question with an **N**, you will be asked for the starting line number of your soon-to-be-created **BASIC**

music program. Then you will be asked if you want a FULL LOADER PROGRAM? If you answer Y, the BASIC program created will include the necessary information so that when your new program is RUN, the machine language "Note Producer" (see Part 1) routine will be POKed in. If you answer N, the routine will not be included. You would answer N if the program you wanted to add the music to already included some sort of "Note" routine (the routine found in Program 5 of Part 1 of "Apple Sounds - From Beeps To Music").

Finally, you will be prompted to check for errors. If everything is all right, enter Y and the file will be SAVED. If you enter N, you have to repeat the entire SAVE process. Here is an example of what the average SAVE command might encompass:

```
COMMAND? S
(Screen is cleared)
FILENAME? SONG.1
STARTING NOTE NUMBER: 2
ENDING NOTE NUMBER: 10
FOR FUTURE ADDITION? N
STARTING LINENUMBER: 100
FULL LOADER PROGRAM? Y
IS EVERYTHING OK? Y
```

Your music file would now be SAVED under the filename SONG.1. The file would consist of notes two through ten, and the generated program would start at line 100. The generated program would include the machine language "Note" routine.

L = LOAD. If you answered Y to the FOR FUTURE ADDITION? question back in the SAVE command, you can LOAD an old music file back into the computer. The catch is that you will lose any data that you entered into the computer beforehand. If you don't want to lose your data, then answer N to the question about losing your data. Just enter the appropriate filename, and you can manipulate or add to your data once again.

N = NORPLAY. As mentioned earlier, when you P (Play/list) your song, it will play at a slower speed because it has to list the note values at the same time. To alleviate that problem, you can use the NORmal PLAY command. This will play your song in the same tempo as it will normally be played by your generated program. Just enter the proper values (or defaults will be used) and listen.

D = DELETE. Upon entering D from the COMMAND? mode, you will be asked which note or notes you want to delete. If you hit RETURN after the first question without typing anything else, the default will be used and the last note in the music file will be deleted. If you enter a value for the first question, you will be asked the number of the last note up to which you want to delete. The appropriate notes will then be deleted, and you're back to the COMMAND? mode.

I = INSERT. This command is the exact opposite of the Delete command. Simply answer the few setup questions and enter the data. Note: You cannot leave the Insert mode until you have entered all the data you specified you were going to enter.

R = RESTART. This command lets you start over with a clean slate beginning with note number one.

C = CATALOG will return a fairly standard DOS catalog.

Q = QUIT. Use this command to exit the program cleanly. You will lose all your data that hasn't been SAVED to disk. If you quit by accident, a GOTO 200 will usually let you reenter the program with no data lost.

. = DOS. What this means is that typing a period followed by any normal DOS command will execute that command. A common use for this might be:

```
COMMAND? .DELETE FILENAME
```

Caution: Certain DOS commands will cause the Apple Music Writer to cease functioning, thus causing a loss of data. Take care.

H = HARD. If you have a printer connected to your Apple, you can get a simple hard copy of your music file by entering H from the COMMAND? mode. Note: You may have to edit lines 1210 and 1220 to accommodate different printers.

Hints For Easier Use

Saving. One good idea is to save two copies of your music file to the disk. One copy should be done in the FUTURE ADDITION? mode so you can edit or add to it at a later date. If you wish, the other copy can be done in the *create program*, or FUTURE ADDITION? N mode. Always remember to use a different filename.

Tempo. When you enter your durations, remember that if your quarter note has a value of 50, your half note will have a value of 100 and so on. You should set a plan of what duration you want a certain type of note to be and work from there. Rests are done with a note value of one.

Limits. The number of notes you can have in one song is limited. For our purposes the number is 500, but by changing the value of L in line 120, this limit can be raised.

Notes. The note listings on the side of the screen are especially helpful if you are transposing sheet music to disk. The numbers listed are for the middle octave. For the higher octave, divide the number by two; and for the lower octave, multiply the number by two. For example, the note F could be represented by the numbers 36, 72, and 144. You can also make a separate list of all the notes and their numbers. Remember, F# is the same as G-flat and so on. Also, once again, the number zero is equivalent to the number 256.

Educational News

Orange Plus Educational News located at 23801 Calabasas Road/Suite 2050/Calabasas, CA 91302/(213) 999-5210

Legal Apple[™] Compatible

New Computer runs CP/M & Apple[™] Software

CALABASAS — Now instructors can teach Apple-type programs such as LOGO in one class and professional-style word processing in another without any hardware changes. Dual microprocessors (Z80-A & 6502, two computers in one case), with the radical new Orange Plus development the "EuroROM", allows the machine to read/write/work with Apple-type software as well as CP/M programs and access either CPU via the keyboard.

The "ORANGE+TWO"™ is a brand new direction in the evolution of the personal computer. ORANGEFORTH-83, a derivative of Fig-FORTH — a readily available public domain language, is resident in the ROM*. Also included is CP/M 3.0, Digital Research's latest CP/M version. There is also a built-in disk drive controller for two Apple-type drives, a cassette interface, joystick port, color graphics and ASCII keyboard with numeric keypad. For expert word processing, the keyboard features upper and lower case (lower case characters are true descenders) with auto repeat.

This new breed of computer is a breakthrough for educators and school systems throughout the world. The ability to run both Apple-type and CP/M software on the same machine relieves financially-pressed educators from expensive equipment burdens, allowing them to spend more money where it counts... **on the teachers.**

*Available on disk at extra cost.

THE LEASING ALTERNATIVE

CALABASAS — Through select leasing companies, Orange Plus Computer Systems will offer the following lease programs to qualified corporations and educational institutions: An "ORANGE+TWO"™ computer with a green monitor and one disk drive for only \$58.55 per month... 36 month closed end lease. Also included is a full maintenance program and all revisions and upgrades that may be available during the term of the lease. Subject to credit approval. Call for additional information.

DISTRIBUTORS:

CALL (213) 999-5210

CALABASAS — Due to the tremendous amount of individual inquiries and dealer applications, qualified stocking distributors are needed. Select areas available!



MORE FOR LESS

The "ORANGE+TWO"™ 64K computer includes these standard features:	
Built-in CP/M 2.2 compatibility	no charge
Digital Research's CP/M 3.0	no charge
Built-in disk drive controller for two Apple-type drives	no charge
Numeric keypad with separate return key	no charge
110/220 volt switch selectable power supply, 50-60 Hz	no charge
Full function ASCII keyboard with auto repeat	no charge
Cassette interface	no charge
Fully grounded metal base plate	no charge
Adjustable audio volume control	no charge
ORANGEFORTH-83, Z80-A FORTH language, resident in ROM	no charge
Z80-A CPU, a second computer	no charge
6 slot double sided logic board	no charge
Bank switchable RAM, fully socketed, expandable to 256K	no charge
Programmable 2764 EPROMs	no charge
TOTAL: "ORANGE+TWO"™	\$1095.00
Compare these features included on the "ORANGE+TWO"™ with the competition's over \$2000 for equivalent product.	

MORE PRODUCTS FROM ORANGE PLUS COMPUTER SYSTEMS TO ENHANCE YOUR "ORANGE+TWO"™, APPLE II/II PLUS, OR FRANKLIN ACE 1000

Disk-based ORANGEFORTH-83 language with full documentation	\$99.95
Digital Research's™ CBASIC with disk and documentation	\$49.95
Orange Plus KoalaPad™ Touch Tablet w/Micro Illustrator™	\$124.95
Orange Plus Joystick (works on "ORANGE+TWO", Apple II, II+, & IIe)	\$29.95
Orange Plus self-centering joystick	\$39.95
10MB (Formatted) 5¼" half-height Winchester Hard Disk Drive	\$1495.00
Controller & Interface for Hard Disk**	\$395.00

**Includes everything necessary to be installed in "Orange+Two", Apple or Franklin Computer
The above are suggested retail prices. Prices may vary from state to state.

Collins International Trading Corporation,
23801 Calabasas Road, Suite 2050, Calabasas, CA. 91302
(213) 999-5210

Exec. In order to use a program that you made in the FUTURE ADDITION? N mode, you must EXEC it. EXEC is a DOS command that prints a sequential text file to the screen as if it were typed from the keyboard. In this way, you can EXEC your file and RUN it as a BASIC program. Later on, you can SAVE it. Another feature is that you can LOAD an old BASIC program (game or whatever) and EXEC your sound routine into it. For this to work properly, however, you must have specified the starting line number during the save of your music file such that the line numbers of the music routine do not conflict with those of the program to which the routine is being added.

Insert. If you have a large amount of repetitive data to type in, one trick is to enter the last note of that data, then Insert the rest. This saves you from repeatedly typing A from COMMAND? mode. (This is useful only if you know beforehand exactly what data you want to enter.)

Keys. There are a number of key codes that you can use with Apple Music Writer. If at any time the screen is getting too cluttered, an ESC-SHIFT-P should do the trick. You can stop a Catalog or a Play/list at any moment with a CTRL-S, and restart it with the touch of any key. Finally, in this program, CTRL-C RETURN can be a useful but sometimes dangerous command. I would recommend using CTRL-C only if you are caught in a never-ending loop or as a last resort. If for any reason you find yourself out of Apple Music Writer, you can usually reenter the program, without losing any data, by typing GOTO 200.

Experiment. No matter how long or well written a manual, nothing can take the place of hands-on experience with a program. Before you try any big projects, be sure you know what's going to happen at all times no matter what you enter during Apple Music Writer. Overall the program is very forgiving. One last thing – the best songs on the Apple seem to be songs with few or no rests. Try using longer notes instead of rests.

If you'd rather not type in the program, send \$3, a stamped, self-addressed disk mailer, and an initialized blank disk (Apple DOS 3.3 compatible) to:

Blaine Mathieu
Box 2572
Peace River, Alberta
Canada, T0H 2X0

Apple Music Writer

```
10 REM APPLE MUSIC WRITER
20 REM INITIALIZATION
30 TEXT : HOME : VTAB 1: PRINT "A=ADDN
OTE E=EDIT P=PLAY S=SAVE
L=LOAD N=NDRPLAY D=DELETE I=IN
SERT R=RESTART C=CATALOG Q=QUIT
=DOS H=HARD": PRINT "-----"
```

```
-----": POKE
34,5
40 VTAB 6: HTAB 34: PRINT "G=64": PRINT
TAB(34): "F=68": PRINT TAB(34):
F=72": PRINT TAB(34): "E=76": PRINT
TAB(34): "D=81": PRINT TAB(34):
D=86": PRINT TAB(34): "C=91"
50 PRINT TAB(34): "C=96": PRINT TAB(
34): "B=102": PRINT TAB(34): "A=10
8": PRINT TAB(34): "A=115": PRINT
TAB(34): "O=121": PRINT TAB(34):
"G=128": PRINT TAB(34): "/2 FOR":
PRINT TAB(34): "HIGHER": PRINT TAB(
34): "2 FOR": PRINT TAB(34): "LOWER
": POKE 33,32
60 FOR LOC = 770 TO 790: READ BYTE: POKE
LOC,BYTE: NEXT
70 DATA 173,40,192,136,208,5,206,1,3,
240,9,202,208,245,174,0,3,76,2,3,96
80 HOME : INVERSE : VTAB 10: HTAB 9: PRINT
"APPLE MUSIC WRITER"
90 FOR R = 1 TO 26: READ P,D: POKE 76B
,P: POKE 769,D: CALL 770: NEXT R
100 DATA 172,75,162,75,152,75,144,75,1
08,100,1,30,144,75,108,100,1,30,14
4,75,108,255,1,10,108,75,96,75,91,
75,86,75,108,75,96,75,86,100
110 DATA 1,10,115,75,96,100,1,10,108,1
50,144,150,216,200,
120 HOME : L = 500: DIM N(L),D(L),N$(L)
,D$(L),NN(L),ND(L)
130 REM MAIN ROUTINES START
140 VTAB 5: GOTO 190
150 I = 1 + 1
160 PRINT : INVERSE : PRINT "NOTE#": I:
NORMAL
165 INPUT "NOTE,DURATION": N$(I),D$(I)
: IF N$ = CHR$(B) OR D$ = CHR$
(B) THEN N$(I) = N$(I - 1): D$(I) =
D$(I - 1)
170 N(I) = VAL(N$(I)): D(I) = VAL(D$
(I)): IF N(I) > 255 OR N(I) < 0 OR
D(I) > 255 OR D(I) < 0 THEN 160
180 POKE 76B,N(I): POKE 769,D(I): CALL
770
190 ONERR GOTO 370
200 PRINT : INPUT "COMMAND?": A$
210 IF A$ = "A" AND I = L THEN PRINT
"YOU ARE AT YOUR LIMIT!!!": GOTO 2
00
220 IF A$ = "A" THEN 150
230 IF I < 0 AND (A$ = "E" OR A$ =
"P" OR A$ = "H" OR A$ = "N" OR A$ =
"I" OR A$ = "S") THEN PRINT "SORR
Y, NO NOTES": I = 0: GOTO 190
240 IF A$ = "Q" THEN 450
250 IF A$ = "E" THEN 470
260 IF A$ = "P" THEN 390
270 IF A$ = "S" THEN 530
280 IF A$ = "D" THEN 1410
290 IF A$ = "L" THEN 990
300 IF A$ = "R" THEN I = 0
310 IF A$ = "C" THEN PRINT CHR$(4)"
CATALOG"
320 IF LEFT$(A$,1) = "." THEN 1120
330 IF A$ = "H" THEN 1160
340 IF A$ = "N" THEN 1250
350 IF A$ = "I" THEN 1310
360 GOTO 190
370 PRINT "ERROR#": PEEK(222): GOTO 190
380 REM PLAY ROUTINE
```

```

390 PRINT : INPUT "STARTING NOTE (D=1)
   : ";SN$:SN = VAL (SN$): IF SN$ =
   " THEN SN = 1
400 PRINT : INPUT "ENDING NOTE (D=LAST
   ): ";EN$:EN = VAL (EN$): IF EN$ =
   " THEN EN = 1
410 IF SN < 1 DR SN > I DR EN < 1 DR E
   N > I THEN 390
420 PRINT : INVERSE : PRINT "START DF
   SDNG": PRINT : NORMAL : FDR X = SN
   TO EN: POKE 768,N(X): POKE 769,D(
   X): PRINT "NOTE#";X: HTAB 10: PRINT
   "NOTE#";N(X): HTAB 19: PRINT "DUR
   ATIDN#";D(X): CALL 770: NEXT X
430 INVERSE : PRINT : PRINT "END DF SD
   NG": NORMAL
440 GOTO 190
450 TEXT : HOME : PRINT "GOODBYE": END

460 REM EDIT ROUTINE
470 INPUT "EDIT NOTE# ";NN: IF NN > I DR
   NN < 1 THEN 470
480 PRINT : INVERSE : PRINT "NOTE#";NN:
   NORMAL : PRINT " OLD: NOTE#";N(NN
   ): " DUR#";D(NN)
490 INPUT "NOTE, DURATION: ";N$(NN),D$(
   NN):N(NN) = VAL (N$(NN)):D(NN) =
   VAL (D$(NN)): IF N(NN) > 255 OR N
   (NN) < 0 DR D(NN) > 255 OR D(NN) <
   0 THEN 480
500 POKE 768,N(NN): POKE 769,D(NN): CALL
   770
510 GOTO 190
520 REM SAVE ROUTINE
530 ONERR GOTO 840
540 HOME : INPUT "FILENAME? ";FI$: IF
   FI$ = "" THEN 540
550 PRINT : INPUT "STARTING NOTE NUMBE
   R: ";SN: IF SN < 1 OR SN > I THEN
   550
560 PRINT : INPUT "ENDING NOTE NUMBER:
   ";EN: IF EN > I OR EN < 1 THEN 56
   0
570 PRINT : INPUT "FDR FUTURE ADDITION
   ? ";A$: IF A$ < "N" AND A$ < "
   Y" THEN 570
580 IF A$ = "Y" THEN POKE 216,0:F2 =
   1: GOTO 640
590 F2 = 0
600 PRINT : INPUT "STARTING LINENUMBER
   ";SL: IF SL > 63900 OR SL < 0 THEN
   600
610 PRINT : INPUT "FULL LOADER PROGRAM
   ? ";A$:A$ = LEFT$(A$,1): IF A$ <
   "Y" AND A$ < "N" THEN 610
620 IF A$ = "Y" THEN FL = 1
630 IF A$ = "N" THEN FL = 0
640 PRINT : INPUT "IS EVERYTHING OK? ";
   A$: IF LEFT$(A$,1) = "Y" AND F2
   = 1 THEN 880
650 IF LEFT$(A$,1) = "Y" AND F2 < "
   1 THEN 670
660 GOTO 190
670 D$ = CHR$(4): PRINT D$;"DPEN"FI$
680 PRINT D$;"DELETE"FI$
690 PRINT D$;"OPEN"FI$
700 PRINT D$;"WRITE"FI$
710 IF FL < "1" THEN GOTO 740
720 PRINT SL;"FORLOC=770770790:READBYTE
   :POKELDC,8YTE:NEXT":SL = SL + 2
730 PRINT SL;"DATA173,48,192,136,208,5
   ,206,1,3,240,9,202,208,245,174,0,3
   ,76,2,3,96":SL = SL + 2
740 PRINT SL;"FORR=1TD":EN = SN + 1:
   READP,D:POKE768,P:POKE769,D:CALL77
   0:NEXTR":SL = SL + 2
750 FDR Z = SN TO EN
760 N = N + 1: IF N = 20 THEN N = 1
770 IF N < "1" THEN 810
780 PRINT
790 PRINT SL;"DATA":
800 SL = SL + 2
810 PRINT N(Z);";":D(Z): IF N < "19
   " THEN PRINT ";";
820 NEXT Z
830 PRINT
840 PRINT D$;"CLOSE"
850 GOTO 190
860 PRINT : PRINT CHR$(7);"ERROR#"; PEEK
   (222): PRINT D$;"CLOSE": GOTO 190
870 REM 2ND SAVE ROUTINE
880 ONERR GOTO 980
890 D$ = CHR$(4): PRINT D$;"DPEN"FI$
900 PRINT D$;"DELETE"FI$
910 PRINT D$;"OPEN"FI$
920 PRINT D$;"WRITE"FI$
930 FOR S = SN TO EN
940 PRINT N(S): PRINT D(S)
950 NEXT S
960 PRINT D$;"CLOSE"
970 GOTO 190
980 REM LOAD ROUTINE
990 ONERR GOTO 1090
1000 INPUT "YDU WILL LOSE YOUR DATA, O
   K? ";DK$:DK$ = LEFT$(DK$,1): IF
   OK$ < "Y" AND DK$ < "N" THEN
   1000
1010 IF DK$ = "N" THEN POKE 216,0: GOTO
   190
1020 PRINT : INPUT "FILENAME: ";FI$: IF
   FI$ = "" THEN 1020
1030 D$ = CHR$(4): PRINT D$;"VERIFY"FI
   $: PRINT D$;"DPEN"FI$
1040 PRINT D$;"READ"FI$
1050 FDR Z = 1 TO L
1060 INPUT N(Z): INPUT D(Z)
1070 IF N(Z) < "255 AND D(Z) < "25
   5 THEN NEXT Z: POKE 216,0: PRINT
   D$;"CLOSE":I = Z - 1: GOTO 190
1080 PRINT : PRINT "INCOMPATIBLE FILE!
   !!!": PRINT D$;"CLOSE": POKE 216,0: GOTO
   190
1090 PRINT D$;"CLOSE": IF PEEK (222) =
   5 THEN POKE 216,0:I = Z - 1: GOTO
   190
1100 PRINT : PRINT "ERRDR#"; PEEK (222
   ): PRINT D$;"CLOSE": GOTO 190
1110 REM HANDLE DDS COMMANDS
1120 ONERR GOTO 1140
1130 DC$ = RIGHT$(A$, LEN (A$) - 1): PRINT
   CHR$(4);DC$: POKE 216,0: GOTO 19
   0
1140 PRINT "ERROR#"; PEEK (222): PRINT
   CHR$(4);"CLOSE": POKE 216,0: GOTO
   190
1150 REM PRINTER ROUTINE
1160 PRINT : INPUT "PRINTER READY? ";A
   $: IF A$ < "Y" AND A$ < "N" THEN
   1160
1170 IF A$ = "N" THEN 200
1180 PRINT : INPUT "STARTING NOTE TO B
   E PRINTED -- DEFAULT=1: ";ST$: IF

```

```

ST$ = "" THEN ST$ = "1"
1190 PRINT : INPUT "ENDING NOTE TO BE
PRINTED -- DEFAULT=ALL: ";EN$: IF
EN$ = "" THEN EN$ = STR$(1)
1200 ST = VAL (ST$):EN = VAL (EN$): IF
ST < 1 OR ST > 1 OR EN < 1 OR EN >
1 OR EN < ST THEN 1180
1210 PRINT : INPUT "NAME OF SONG: ";F1
$: IF F1$ = "" THEN 1210
1220 PR# 1: PRINT : PRINT F1$: PRINT :
FOR X = ST TO EN: PRINT "NOTE#";X
: HTAB 10: PRINT "NOTE#";N(X): HTAB
19: PRINT "DURATION#";D(X): NEXT X

1230 PRINT : PRINT "END OF SONG": PR#
0: GOTO 190
1240 REM NORMAL PLAY ROUTINE
1250 PRINT : INPUT "STARTING NOTE (D=1
): ";SN$:SN = VAL (SN$): IF SN$ =
"" THEN SN = 1
1260 PRINT : INPUT "ENDING NOTE (D=LAS
T): ";EN$:EN = VAL (EN$): IF EN$ =
"" THEN EN = 1
1270 IF SN < 1 OR SN > 1 OR EN < 1 OR
EN > 1 THEN 1250
1280 FOR Z = SN TO EN: POKE 768,N(Z): POKE
769,D(Z): CALL 770: NEXT Z
1290 GOTO 190
1300 REM INSERT ROUTINE
1310 POKE 216,0: PRINT : INPUT "INSERT
BEFORE WHAT NOTE? ";IB: IF IB < 1
OR IB > 1 THEN 1310
1320 PRINT : INPUT "HOW MANY NOTES TO
INSERT? ";HM: IF HM > 1 - 1 OR HM <
1 THEN 1320
1330 FOR Z = IB TO IB + HM - 1
1340 PRINT : INVERSE : PRINT "NOTE#";Z:
NORMAL : INPUT "NOTE,DURATION: ";
NN(Z),ND(Z): IF NN(Z) < 0 OR NN(Z)
> 255 OR ND(Z) < 0 OR ND(Z) > 255
THEN 1340
1350 POKE 768,NN(Z): POKE 769,ND(Z): CALL
770
1360 NEXT Z
1370 FOR Z = I TO IB STEP - 1:N(Z + H
M) = N(Z):D(Z + HM) = D(Z): NEXT Z

1380 FOR Z = IB TO IB + HM - 1:N(Z) =
NN(Z):D(Z) = ND(Z): NEXT Z
1390 I = I + HM
1400 GOTO 190
1410 REM DELETE ROUTINE
1420 PRINT : INPUT "DELETE FROM NOTE (
D=LAST): ";DF$: IF DF$ = "" THEN I
= I - 1: IF I = - 1 THEN I = 0: GOTO
190
1430 IF DF$ = "" THEN 190
1440 PRINT : INPUT "TO NOTE: ";DT$:DF =
VAL (DF$):DT = VAL (DT$): IF DT <
1 OR DT > 1 OR DF < 1 OR DF > 1 OR
DF > DT THEN 1420
1450 FOR Z = DT + 1 TO I:N(Z - (DT - D
F + 1)) = N(Z):D(Z - (DT - DF + 1))
= D(Z): NEXT Z
1460 I = I - (DT - DF + 1): GOTO 190

```

©

EPSON*, NEC*, PROWRITER*, GEMINI*, OKIDATA 92*

NEW!
Atari*



The only self-booting grafix handler for dumps in horizontal format — all mach. lang. — Lister incl. — all modes — mixed modes — change aspect ratios, etc. while running other programs — assem ed — basic or no cartridge — demos, utilities, fonts, included — dump, create forms, stationary, calendars, requires interface.

ONLY **\$26⁹⁵**

diskwiz

Map, search, repair, duplicate, fix link pointers, alter, speedcheck, bad sectoring (810 only), block move, trace, manual, special print capabilities, disassembler, and more! — the best disk repair/editor at any price — and at the lowest price!

\$28⁹⁵

1st Class Postage Paid

California Residents add 6%, Foreign Orders add \$2.50

C.O.D. add \$2.00 — No credit cards

Prices subject to change

(213) 376-0155

**ALLEN
MACROWARE**

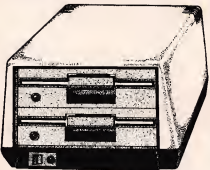
P.O. Box 2205

Redondo Beach, CA 90278

* Indicates Trademark of non-related company

LOOK WHAT WE HAVE FOR YOUR ATARI® HOME COMPUTER

More Disk Drive for your money. In fact, with the Astra 1620, you get two superb Disk Drives for the price of one. The Astra 1620 is single in Double Density (softdisk) and completely compatible with Atari Disk or Disk II. Get them used as Double Density for the Atari 1620 has the same capacity as four Atari 810* Disk Drives.



The ASTRA 1620 DOUBLE DENSITY — DOUBLE DISK DRIVE HAS A SUGGESTED LIST PRICE OF \$595.00.

**ASTRA
SYSTEMS**

9220 CLARK AVENUE • LAKEWOOD, CA 90712 • PHONE (213) 804-1475
ASTRA is a registered trademark

INSIGHT: Atari

Bill Wilkinson

Bill concludes last month's column with a program demonstrating the capabilities of the new graphics modes.

If you were a little disconcerted by our discussion last month, here is a little BASIC program which demonstrates the capabilities of the new modes in a crude, but visible, fashion. As usual, I will explain the program line by line.

120. Selects a normal GRAPHICS 2. This is our starting point.

130. Prints a reference line on the screen. This is simply so you can tell where the columns of characters are later, when they get MAPped.

150-180. Print what are now normal characters. Note that the underline denotes inverse video characters (via the Atari key). Did you notice that each set of four characters here will produce the MAP patterns 00, 01, 10, and 11 (in that order) on each line of the displayed area? Remember that the other six bits, then, will select a character from character memory.

190, 290, 320, and 340. Just messages, to tell you what we are doing.

200-220. We are moving the normal Atari 800 character set from its normal location (\$E000) to RAM at address \$6000. Note: This requires a 32K machine.

230-250. Here we read the DATA statements from lines 380 to 420 and change the character set for the characters A, B, C, and D.

260-280. A quick and dirty way to arbitrarily select some colors for the various color registers.

300 and 330. Just some delay loops, so you can actually see it happening.

310. Changes the CHBASE (Character BASE pointer) to point to location \$6000, where the new character set pattern is.

350. The magic instruction. Look at your screen. How many different colors do you see?

Do you see the relation between the display and the table? Did you notice that the first character in each line "disappeared"? That's because these characters are using MAP 00, the "all background" map.

I think the only thing left is to explain the bit patterns of the modified characters which are read in by lines 230 to 250.

Character A is changed to a solid block of all

"11" bits (thus the pattern is eight \$FF bytes).

Character B is changed to a solid block of all "10" bits (eight bytes of \$AA). Character C is a solid block of "01" bits (eight bytes of \$55).

Finally, character D has a purposely varied pattern. The bit patterns in the byte are as follows:

228	\$E4	11	10	01	00
57	\$39	00	11	10	01
78	\$4E	01	00	11	10
147	\$93	10	01	00	11

and then the same bytes in reverse order.

The result of the shifted bit pattern shown is, quite naturally, the "arrows" which you see in the program's display.

Finally, we are finished explaining these new modes. What good are they? Just imagine what Chris Crawford could do with a map which displays seven different colors, instead of only four. But surely there are other uses. How about inventing some and sharing them with us?

```
100 REM DEMO OF THE "NEW" GRAPHICS MODE!
110 REM
120 GRAPHICS 2
130 PRINT #6;"wxyz"
140 PRINT #6;" "
150 PRINT #6;"AaAa"
160 PRINT #6;"BbBb"
170 PRINT #6;"CcCc"
180 PRINT #6;"DdDd"
190 PRINT "THIS IS IN NORMAL GRAPHICS 2"
200 FOR A=24576 TO 25599
210 POKE A,PEEK(A+32768)
220 NEXT A
230 FOR A=24840 TO 20671
240 READ D:IF D<0 THEN 260
250 POKE A,D:NEXT A
260 FOR A=0 TO 8
270 POKE 704+A,10*A+18
280 NEXT A
290 PRINT "THIS IS WITH COLORS CHANGED"
300 FOR I=1 TO 1000:NEXT I
310 POKE 756,96
320 PRINT "THIS IS THE MODIFIED CHARACTER S
ET"
330 FOR I=1 TO 1000:NEXT I
340 PRINT "FINALLY, THE NEW AND SPECIAL MOD
EI"
350 POKE 623,128
360 REM == JUST A LOOP TO KEEP DISPLAYING ==
370 GOTO 360
380 DATA 255,255,255,255,255,255,255,255
390 DATA 170,170,170,170,170,170,170,170
400 DATA 85,85,85,85,85,85,85,85
410 DATA 228,57,78,147,147,78,57,228
420 DATA -1
```

Debugging

When you write a program, you're going to make mistakes. It's hard on the ego, but there it is: none of us are perfect. And we cannot consider our program complete unless we have worked out the errors. Not just the obvious ones – those will be easy to spot since they will often prevent the program from running. We need to go further: to methodically search out less obvious bugs and get them out of there.

When a good programmer completes a program and turns to the testing and debugging phase, he or she needs to have something of a split personality. The natural way for us to respond is to hope that there are no bugs, and sometimes that means that we don't try very hard to find them. The smart programmer switches from a Doctor Jekyll coder to a Mr. Hyde tester, mercilessly trying to find weak spots in the program.

There's no fixed procedure for testing. The programmer will try running "ordinary" data through his program, of course, but should also try probing for weak spots – badly formatted lines, operator errors. Test files should be carefully prepared in advance, and output files closely examined after the run.

Debugging Aids

Today's microcomputers seem somewhat weak on formal debugging aids compared to the "big" computers, but this is partly an illusion. Mainframes can't tolerate programmers playing with the toggle switches – time is money, and the machines have many tasks to do. Because of this, elaborate debugging aids have been developed to allow the programmer to trace down troubles away from the computer.

Microcomputers, on the other hand, are often readily available to the programmer; debugging can take place on-line, and the formal aids are needed less.

We can do many things "on-line" on our micros that must be done "off-line" on big machines. For example, a major debugging aid is the "memory dump" – formerly called a "core dump" when memory was made of small magnetic cores. The big-system programmer would receive dozens of pages of memory printout – often in octal or hexadecimal – and might spend hours studying it. The microcomputer programmer, on the other hand, can simply inspect the contents of memory at the computer itself.

There's a style difference, however. A programmer who sits in a cubicle with printout and a pencil is likely to be less hasty in his analysis. On the other hand, a programmer who sits before a memory display on his machine is likely to shout, "I know what it is!" and immediately type in changes and run again. Sadly, most such changes don't work out. When we're in a rush, we tend to try to fix the symptoms rather than the problem.

Let's discuss some of the formal methods available on big computers that can be used on our micros.

The Memory Dump

A program of any significant size leaves a trail behind it in memory. It accepts input, and puts that input somewhere. It uses work areas, builds tables, and computes statistics. It prepares output. All of these leave traces in memory. In fact, experienced programmers often make sure that these values will be there to aid testing. A work area would be cleared immediately before use, not immediately after, so that its contents will be visible until the next use.

Careful examination of memory can be one of the most powerful tools in the debugging repertoire. Everything is there: your program, your data, your work areas. With enough close study, you'll almost certainly find the problem.



See your local dealer or write to:



INTERESTING SOFTWARE

21101 S. Harvard Blvd.
Torrance, CA 90501
(213) 328-9422

VISA/MC/Check/Money Order - Add \$2.00

CA residents add 6 1/2% sales tax

DEALER INQUIRIES INVITED

\$49.95

Traces

A *trace* calls on a computer to report every time it passes a given program point. Full traces cause the computer to report every instruction it executes, which creates a great deal of output. *Branch traces* report only the changes in logic flow — branches that are taken, jumps, subroutines that are called, etc. You can tell roughly where a program was working when it got into trouble, since you'll see the last place that it went to a new location. Similarly, you can see the logic flow so that a program can be checked to verify that it did indeed take a given jump.

We have a comparable facility to Trace on our microcomputer; it's sometimes associated with single step. Instructions are displayed on the screen as they are executed. Specialized tools like "branch traces" are less needed; we can watch the program run and see the branches.

Snapshots

The *snapshot* allows you to see a copy of memory at a given time: say, when a particular instruction is executed. It allows you to watch a work area and see how it is built over time.

We can achieve similar results by putting *breakpoints* into our program. These are often just BRK, "break," instructions. Each time we reach a breakpoint, the program will stop, and we may examine memory locations as desired. Then we may allow the program to continue where it left off — until the next break.

The Wolf

You may hear of the "wolf fence" method of debugging. That's just another way of asking your program to tell you when it passes a given point (crosses the "wolf fence"). In this way, you should be able to tell which section of your program contains the bug (the "wolf"). It's just common sense: dividing your program into ever-smaller pieces and checking out each piece.

Debugging is partly an art: some people are very good at it. It's also a science: you must be methodical in making sure your programs work right. But in any case, it's a duty: find your own bugs before other users fall prey to them.

COMPUTE! is looking for good articles, tutorials, and games for the Timex/Sinclair, Commodore 64, and Color Computer.

* ! BREAK AWAY FROM BASIC ! *

6502 MACHINE LANGUAGE ASSEMBLER

for the endless universe of VIC-20 and C-64 computers

PROFESSIONAL FEATURES INCLUDE:

- FULL SCREEN TEXT EDITOR for Program Entry or Word Processing
- STANDARD ASSEMBLER UTILITIES: Symbols, Labels, Arithmetic operators
- PLUS — Extensive Error Checking and Reporting
 - Listing Control: On-Off, Pagination, Symbol Table, etc.
 - Checking for Unverified Source: length, even with small memory size
- FULL CHOICE OF OUTPUT DEVICES: Printer, Disk, Screen, Memory Tape
- SPECIAL MEMORY-TO-MEMORY MODE FOR SUPER FAST ASSEMBLY
- OBJECT CODE COMPATIBLE with standard PROM PROGRAMMERS to produce firmware

ASSEMBLER/TEXT EDITOR supplied on disk or cassette

Specify VIC-20 or C-64 \$32.95

— DOCUMENTATION ONLY (Refundable with order) \$ 4.00

— ALSO DISKETTES 1540/1541 Certified Error Free, Pack of ten \$19.95

OSIRIS

413 TREASANT LANE
SANTA ROSA, CA 95401
(707) 526-0006

April 20-22 Postage
California residents add 6% Tax.
VIC-20 and C-64 trademarks of Commodore

NEW

Also Available

Pro-Geny

GENEALOGY

pro-file
FANTASTIC NEW SOFTWARE
for your **COMMODORE 64** \$49.95

- AN EASY TO USE DATA BASE
- FILE MAINTENANCE (renaming, copying, etc.)
- UP TO 500 RECORDS per FILE
- PRINTS ADDRESS LABELS
- Master Card • Visa • G.D. Orders Accepted
- Send Orders and Inquiries to:

A-1 SERVICES
7103 W. Clearwater H-228 • Clearwater, FL 98336
(800) 783-4880

Dealer Inquiries Welcome

COMMODORE-64™ and VIC-20™ users!

Meet on...
IMP
DOT MATRIX PLAIN PAPER PRINTER
IMPACT PRINTER
COMES COMPLETE
WITH ALL 20/64
INTERFACES
CABLES

Impact Printer
by
Ridley
Electronics
7"X4.5"X2"



Features: High quality print head—MCR equal to 500,000 lines, 5 x 7, 30cps impact dot matrix, 144 dots per line, 2.25" w plain paper roll and cartridge ribbon included. Up to 40 column width, lower case descenders, upper/lower case characters, can reproduce the entire 20/64 graphics set, dot addressable graphics, supports custom character capability, reverse character mode, permits user selection of two character sets. Transformer included. 90-day warranty. N.Y. residents add applicable sales tax.

All Major Credit Cards Accepted

129.95

Send Check or M.O.
or \$16.95 Down

DEALER
INQUIRIES
INVITED



"Call THE Printer Experts"

For Information and Orders

Toll-Free 1-800-645-4710

(in N.Y., outside cont. U.S. 516-221-3000)

2951 MERRICK RD., DEPT. C11 BELLMORE, NY 11710

Vic 20 and Commodore 64 are trademarks of Commodore Electronics Ltd.

French Silk DEVELOP-64

Powerful enough for the professional
friendly enough for everyone

An integrated Assembler Editor Loader Decoder Debugger
which comes complete with

Inside the Commodore 64



This step-by-step guide to machine language and assembly language programming will teach you what you don't already know and assist you to use what you do. Combined with the integrated set of software tools of Develop-64, it makes the ideal development system.

A total reference work on the Commodore 64, *Inside the Commodore 64* gives you inside information on the inside of the machine: its graphics, its music synthesizer, its built-in software and the techniques for taking advantage of the many powerful features of this computer. A complete memory map is provided with information on how to call the internal programs from your own. Written as a programmer's guide with a machine language programmer's perspective, it will become your primary reference guide. If you are still learning you will find it your best teacher.

Priced at \$19.95, *Inside the Commodore 64*
comes free with Develop-64 (\$99.95)

Ask for them at your favorite software outlet.

Software for Commodore Personal Computers.

PO Box 207, Cannon Falls, MN 55609 (507) 263-4821

Commodore 64
and
VIC-20

SuperTerm

\$99⁹⁵



Telecommunications

with a difference!

Unexcelled communications power and compatibility, especially for professionals and serious computer users. Look us over; **SuperTerm** isn't just "another" terminal program. Like our famous Terminal-40, it's the one others will be judged by.

- **UP/DOWNLOAD FORMATS** — CBM, Xon-Xoff, ACK-NAK, etc.
- **DISPLAY MODES** — 40 column; 80/132 with side-scrolling
- **EMULATION** — 42 popular terminal protocols
- **FUNCTION KEYS** — 8 standard, 52 user-defined
- **BUFFERS** — Receive, Transmit, Program, and Screen
- **EDITING** — Full-screen editing of Receive buffer
- **FILE CONVERSION** — ASCII to PGM, PGM to ASCII
- **PRINTING** — Continuous printing with Smart ASCII and parallel printer; buffer printing with other interfaces or VIC printer
- **DISK SUPPORT** — Directory, Copy, Rename, Scratch, etc.
- **FLEXIBILITY** — Select baud, duplex, parity, stopbits, etc.

Program options are selected by menus and function keys. For maximum convenience, an EXEC file sets options on start-up. SuperTerm may be backed-up for safety. Software on disk or cassette, with special cartridge module.

Write for the full story on SuperTerm; or, if you already want that difference, order today!

Requires Commodore 64 or VIC-20, disk drive or Datasette, and compatible modem. VIC version requires 16K memory expansion. Please specify VIC or 64 when ordering.

Just need UP/DOWNLOAD?

If you don't yet need SuperTerm's power, perhaps **Terminal-40 Plus (VIC)** or **64 Terminal Plus** is right for you. We took our top-rated, smooth-scrolling terminal programs, added up/download, disk commands, and even more convenience. Then we put them on disk for fast loading, just like you wanted. Need we say more?

Only \$49.95 (VIC version requires 8K mem exp)

P.S. Trade in your original Terminal-40 or 64 Terminal and deduct \$10.00

VIC 20 and Commodore 64 are trademarks of Commodore Electronics, Ltd.

(816) 333-7200

Send for a free brochure.



**MIDWEST
MICRO inc.**

MAIL ORDER: Add \$1.50 shipping and handling (\$1.50 for COD). VISA/Mastercard accepted (credit and exp. dates, MD numbers add \$4.00% sales tax. Foreign orders payable U.S. \$ only. Add \$5 shipping).

311 WEST 72nd ST. • KANSAS CITY • MO • 64114

Phone Directory And Dialer For The TI

Ken McCann

This useful program will work as a phone number file as well as an automatic dialer. It will run on the TI with or without Extended BASIC.

Your computer, cassette recorder, and TV are all you need to run this program. Although it is written in standard TI BASIC, it will run faster if you have Extended BASIC.

DATA statements are included in the program, so only one load is required. Also, with the data files at the beginning of the program, data entry is simple and straightforward. The line numbers and the file numbers are the same, to make updating and deleting less complicated.

DATA Line Format

Enter the name and phone number information for your personal directory in the form shown below (also see line 1 in program for same example):

Line No.	File No.	Name	Phone Number
1 DATA	1,	MCCANN,K,	1,2,3,4,5,6,7
variables	A	B\$	CDEFGHI
(in program)			

The last DATA entry must be followed by an END line. For example:

140 DATA 140,END

Auto Dialing

In most cases, the accuracy of the frequencies generated with the CALL SOUND statement is not close enough to use as "touch tones" to dial the phone. Therefore, I executed CALL SOUND statements with a frequency counter hooked up to the TV audio output, and added or subtracted until I got the proper frequency.

To use the Auto Dial feature, hold the phone up to the speaker of your TV and press C. Note that you must have a Touch-Tone type phone to use the Auto Dial feature. Two tones were used, and the frequencies for each digit of the phone

dial are as follows:

1 697,1209	6 770,1447
2 697,1336	7 852,1209
3 697,1447	8 852,1336
4 770,1209	9 852,1447
5 770,1336	0 941,1336

Program Operation

Search Name and Dial: Type RUN, then press N to enter the Search mode. You are prompted to enter the Name *exactly* as it is in the files and then to press ENTER. The computer will display the DATA item called for. Press C, and the computer will PRINT the number and sound the dial tones for the number.

List: Type RUN, then press L to enter the List mode. You will see DATA as it is in the files. Press C to look at the entire list.

Letter Index List: Type RUN, then press I to enter the Index Mode. Then simply enter the first letter of the last name and press ENTER. The computer will display all the entries beginning with that letter.

Program Explanation

Lines 1-299 can be used for DATA statements. Remember to put the END statement last, after all files are listed.

Lines 300-480 set up the menu.

Lines 510-740 list all DATA items in the order they appear.

Lines 810-990 search DATA for a particular name.

Lines 1000-1820 dial the number and print the file number.

Lines 1830-2030 search for and print all names beginning with a given letter.

Phone Directory

```
1 DATA 1,MCCANN,K,2,1,2,4,4,4,4
2 DATA 2,CLAUSS,S,5,5,5,5,1,2,1,2
3 DATA 3,NIXON,R,3,3,3,4,5,4,5
4 DATA 4,END
500 CALL CLEAR
```

```

310 PRINT "PHONE DIRECTORY"
320 PRINT "(3 SPACES)& DIALER:::"
330 PRINT "SELECT MODE DESIRED"
340 PRINT
350 PRINT
360 PRINT
370 PRINT "LIST ALL ENTRIES
(6 SPACES)(L)"
380 PRINT
390 PRINT "SEARCH NAME & DIAL
(4 SPACES)(N)"
400 PRINT
410 PRINT "LETTER INDEX LIST
(5 SPACES)(I)"
420 CALL KEY(0,KEY,STATUS)
430 CALL SOUND(50,4000,0)
440 IF STATUS=0 THEN 420
450 IF KEY=76 THEN 500
460 IF KEY=78 THEN 700
470 IF KEY=73 THEN 1020
480 GOTO 1260
490 REM
500 REM
510 CALL CLEAR
520 CALL SCREEN(16)
530 PRINT "PHONE DIRECTORY LIST"
540 PRINT
550 FOR I=1 TO 200
560 PRINT
570 READ A
580 READ B$
590 IF B$="END" THEN 1770
600 READ C,D,E,F,G,H,I
610 PRINT "FILE NUMBER ">;A
620 PRINT
630 PRINT "NAME ">;B$
640 PRINT
650 PRINT "NUMBER">;C;D;E; "-" ;F;G;H
;I
660 PRINT
670 PRINT "PRESS <C> TO PROCEED WIT
H"

680 PRINT "LIST"
690 REM
700 CALL SOUND(100,1000,2)
710 CALL SOUND(75,675,2)
720 CALL KEY(0,KEY,STATUS)
730 IF STATUS=0 THEN 720
740 IF KEY=67 THEN 760
750 PRINT
760 NEXT I
770 REM
780 REM(3 SPACES)
790 CALL CLEAR
800 CALL SCREEN(12)
810 REM
820 PRINT "NAME SEARCH"
830 PRINT
840 PRINT "ENTER NAME TO SEARCH FOR
"
850 INPUT I$
860 PRINT
870 PRINT
880 PRINT
890 FOR S=1 TO 2000
900 REM
910 IF B$="END" THEN 1780
920 READ B$
930 IF B$<>I$ THEN 1530

940 PRINT "INDEX LETTER ">;SEG$(B$,
1,1)
950 PRINT
960 PRINT "NAME ">;B$
970 PRINT
980 PRINT "READY TO DIAL"
990 PRINT
1000 PRINT "PRESS >C< TO DIAL NUMBE
R"
1010 PRINT
1020 CALL SOUND(100,1000,2)
1030 CALL SOUND(75,675,2)
1040 CALL KEY(0,KEY,STATUS)
1050 CALL SOUND(50,2000,6)
1060 IF STATUS=0 THEN 1040
1070 IF KEY=67 THEN 1090
1080 REM
1090 REM
1100 READ C
1110 PRINT C;
1120 N=C

1130 GOSUB 1430
1140 READ D
1150 PRINT D;
1160 N=D
1170 GOSUB 1430
1180 READ E
1190 PRINT E;
1200 N=E
1210 GOSUB 1430
1220 READ F
1230 PRINT F;
1240 N=F
1250 GOSUB 1430
1260 READ G
1270 PRINT G;
1280 N=G
1290 GOSUB 1430
1300 READ H
1310 PRINT H;
1320 N=H
1330 GOSUB 1430
1340 READ I
1350 PRINT I;
1360 N=I
1370 GOSUB 1430
1380 READ A
1390 A=A-1
1400 PRINT "(5 SPACES)":
1410 PRINT "FILE NUMBER ">;A
1420 GOTO 1740
1430 IF N=1 THEN 1540
1440 IF N=2 THEN 1560
1450 IF N=3 THEN 1580
1460 IF N=4 THEN 1600
1470 IF N=5 THEN 1620
1480 IF N=6 THEN 1640
1490 IF N=7 THEN 1660
1500 IF N=8 THEN 1680
1510 IF N=9 THEN 1700
1520 IF N=0 THEN 1720
1530 NEXT S
1540 CALL SOUND(100,1209,0,697,0)
1550 RETURN
1560 CALL SOUND(100,1336,0,697,0)
1570 RETURN
1580 CALL SOUND(100,1447,0,697,0)
1590 RETURN
1600 CALL SOUND(100,1209,0,770,0)

```

```

1610 RETURN
1620 CALL SOUND(100,1336,0,770,0)
1630 RETURN
1640 CALL SOUND(100,1447,0,770,0)
1650 RETURN
1660 CALL SOUND(100,1209,0,852,0)
1670 RETURN
1680 CALL SOUND(100,1336,0,852,0)
1690 RETURN
1700 CALL SOUND(100,1447,0,852,0)
1710 RETURN
1720 CALL SOUND(100,1336,0,941,0)
1730 RETURN
1740 PRINT
1750 PRINT "type >RUN< to start pro
      gram again"
1760 END
1770 PRINT
1780 PRINT "end of list"
1790 PRINT
1800 PRINT "type >RUN< to start pro
      gram over"
1810 END
1820 CALL CLEAR
1830 CALL SCREEN(15)
1840 PRINT "LETTER INDEX LIST"
1850 PRINT
1860 PRINT "ENTER FIRST LETTER IN L
      AST NAME TO SEARCH FOR"
1870 PRINT
1880 INPUT H$
1890 PRINT
1900 FOR Z=1 TO 2000
1910 READ B$

```

```

1920 IF B$="END" THEN 1990
1930 IF SEG$(B$,1,1)<>H$ THEN 1980
1940 READ C,D,E,F,G,H,I
1950 PRINT B$
1960 PRINT C,D;E; "-" ;F;G;H;I
1970 PRINT
1980 NEXT Z
1990 PRINT
2000 PRINT "END OF LETTER INDEX FIL
      E"
2010 PRINT
2020 PRINT "TYPE >RUN< TO START ABA
      IN"
2030 END

```

©

Get more from your VIC-20.

With the VIC Software Availability List (V-SAL)

V-SAL is an extensive and unbiased listing of software and where to find it. It will help you turn your VIC-20 into the versatile computer you need. Save yourself the time and trouble of searching for the software you want (for your VIC-20) by ordering one today.

Send \$4.00 to V-SAL, RES Co.
P.O. Box 12784
Tucson, Arizona 85732-2784

VIC-20 is a registered trademark of Commodore Business Machines, Inc.

64K MEMORY FOR THE *VIC 20



ANNOUNCES
THE ULTIMATE *VIC 20 MEMORY!



* THE 64KV MEMORY EXPANSION MODULE W/64K OF NORMAL EXPANSION + 40K ADD'L FOR PROGRAM OR DATA STORAGE. 800000 MEMORY TO ALMOST 70,000 BYTES. ALMOST TWICE THE USABLE MEMORY OF THE *644. ALL 6K BLOCKS ARE SWITCH SELECTABLE AND WRITE PROTECTABLE. THE ENTIRE UNIT DRAWS ONLY 250 MA. THE 64 KV HAS A GOLD PLATED EDGE CONNECTOR AND IS HOUSED IN A DISTINCTIVE BLACK CASE. ALL THIS AT A PRICE YOU CAN AFFORD.

\$149.95

ALSO NEWLY RELEASED FROM LETCO:

* DELUXE 4-SLOT EXPANSION CHASSIS WITH EXPERIMENTER'S SLOT FOR BLOCK ADDRESS CHANGES, SEPARATE POWER SWITCHES, FUSE, AND A RESET BUTTON FOR THE *VIC. **\$29.95**

* CUSTOM PLASTIC CASE TO FIT *VIC'S EXPANSION SLOT. GREAT FOR YOUR CREATIVE HOME PROJECTS. HAS HOLE FOR DIP SWITCH. 7 1/2" x 5 1/2" x 1 1/2" AND BOARD. **\$9.95**

* FROM ACCESSORY FOR OUR 64KV TO MAKE IT EASY TO PROGRAM BASIC TO USE ALL MEMORY AVAILABLE. INSTALLED NEW OR ADDED TO THE LETCO 64KV. **\$29.95**

WRITE:

LETCO, DEPT. CMH
LEADER ELECTRONIC TECHNOLOGY CO.
7910 WELLS RD.
PLAIN CITY, OH 43084
OR CALL: 1-814-873-8410

WE ACCEPT VISA, MASTERCARD, CHECK OR MONEY ORDER. FOR CHARGE ORDERS PLEASE INCLUDE ADD'L NO., EXP. DATE, AND SIGN.

90 DAY LIMITED WARRANTY ON ALL PRODUCTS
OHIO RESIDENTS ADD 5% SALES TAX

* REG. TM OF CCM INC.

COMMODORE USERS

Join the largest, active Commodore users group.
Benefit from:

- Access to hundreds of public domain programs on tape and disk for your Commodore 64, VIC 20 and PET/CBM.
- Informative monthly club magazine **THE TORPET.**

Send \$1.00 for Program & Information Catalogue.
(Free with membership).

Membership	Canada	— \$20 Can.
Fees for	U.S.A.	— \$20 U.S.
12 Months	Overseas	— \$30 U.S.

Toronto Pet Users Group Department "S"

1912A Avenue Road, Suite 1
Toronto, Ontario, Canada M5M 4A1

* LET US KNOW WHICH MACHINE YOU USE *

Modem Save And Download For The VIC-20

Dennis Colombo

When used together, this series of programs will let you save downloaded VICmodem files and listings. Also included is a program which will convert a downloaded listing to a tokenized BASIC program that you can run. Requires expansion memory.

After I bought my VICmodem, it soon became evident that I needed a way to store all the information which was coming over the line and relentlessly scrolling off the top of the screen. Without a disk drive, I needed a way to store the data on tape so I could later read the information off the screen or edit and make hard copies of selected data such as specific files, airline schedules, or encyclopedia information. Connect time could be appreciably reduced if I didn't have to stop and absorb the information as I received it. With these considerations in mind, I wrote Programs 1, 2, and 3.

Also, there is another type of data which may be retrieved: program listings. While the capability to store and read these listings is useful, they probably won't be in a form your VIC will understand, and they will not run. So I wrote Program 4, which will convert a BASIC listing back into a "tokenized" BASIC program which will run.

Machine Language Is More Effective

Program 2 will run the terminal and allow the information to be saved to tape and printed on the VIC printer. It uses 2K of memory; the remaining RAM is utilized as a buffer to hold the information until it is sent to tape or printer. The program was written with a 16K expander, but will work with an 8K or 24K expander. Although it could easily be modified to run without memory expansion, the small amount of memory left for

the text buffer would fill up too quickly to be practical.

Program 1 loads VIC to ASCII and ASCII to VIC lookup tables, a machine language subroutine to send and receive data, and a machine language interrupt service routine into memory. I had originally attempted to write the terminal program entirely in BASIC. I found, however, that for receiving large amounts of text, BASIC was too slow. This resulted in buffer overflow and frequent loss of data. The machine language subroutine in Program 1 which handles data reception and transmission is far more effective.

Program 3 will allow you to search through the text in RAM and select portions to be displayed on the screen and sent to the printer.

Program 4 will download a BASIC listing utilizing the "dynamic keyboard" technique. Each line of the BASIC listing in memory is entered as though it is typed directly from the keyboard.

Creating The Modem Save Program

Program 1 should be typed in first. SAVE a copy on tape or disk, since the program destroys part of itself as it is RUN. When you RUN the program, checksums will be calculated to help detect any typing errors you may have made in the DATA statements. If no errors are reported, type NEW, but do not reset the computer. It is important that the data which Program 1 POKES into memory still be there when you type in Program 2. Remember that the NEW command does not clear memory, but only resets pointers.

Program 2 should be typed in exactly as shown; otherwise, when it is RUN, the BASIC pointers may cut off the end of the program. After you finish typing it in, PEEK locations 45 and 46. They should contain the values 49 and 20 respectively. If not, you have either added to or left some-

thing out of the program. SAVE a temporary backup copy at this point in case you have problems with the next step.

Now that you have Program 2 typed in, you must attach the tables and machine language programs which were loaded into memory by Program 1. You can do this by typing POKE 45,1:POKE 46,26 and RETURN. This fools BASIC into thinking that Program 2 includes all the memory up to location 6655, the end of the memory loaded by Program 1. You should now SAVE the new Program 2. All further references to Program 2 are to this version of the program which includes the tables and machine language routines.

To test whether all the data from Program 1 was in fact included in Program 2, type SYS 64802 to clear memory, then LOAD Program 2. Next, type in the following direct mode line and hit RETURN:

```
FOR A=6144 TO 6655: SUM=SUM+PEEK(A): NEXT  
: PRINT SUM
```

If the value reported is 62616, then the data has been included. If not, you'll have to LOAD and RUN Program 1 again, type NEW, LOAD the temporary backup copy of Program 2 you made earlier, then try the POKEs to 45 and 46 and the SAVE again. Once your Program 2 passes this test, you won't need Program 1 again.

You're Ready To Dial

When Program 2 is run, the screen will clear and a cursor () will appear in the upper-left corner of the screen. You are now ready to dial up CompuServe or another telecommunications service and connect to the modem. Use the F1 key for Control-C; F3 for Control-P (Break); F5 for Control-Q (resume sending); and F7 for Control-S (stop sending). The interrupt service routine signals with an audible alarm when your text buffer is within 256 bytes of being filled.

You then have the option of logging off and saving your text to tape or printer, or remaining on-line while your text is being saved (about five minutes for 16K) and refilling your buffer with more text. These options are implemented by logging off or by depressing F7 (stop sending) and then pushing the British pound sign key. You will then be asked to select from a menu whether you wish to send the text to tape, printer, or both.

After the SAVE, you will be asked if you are still logged on. If not, the program ends. If you respond that you are still logged on, the program resets the text buffer, clears the screen, and you are ready to continue by depressing F5 (resume sending).

After you have saved your text to tape, you can load it back in at any time and use Program 3

to search and select portions for display and printing. When loading the text back into your VIC, you may occasionally get a ?LOAD ERROR message. Don't be concerned - your data should still be intact. After loading the text tape, type NEW and LOAD Program 3.

When RUN, Program 3 will display a set of instructions. Press the SPACE BAR to start and stop the printing of text to screen as many times as desired. When the text is stopped, the S or E key can be used to mark the start or end of selected text. The starting or ending point will be the last character to appear on the screen before the text is stopped. The memory location of that character will appear on the screen, and you will be given the opportunity to change the start (or end) of selected text by changing this number. Once the end of the text has been marked, press the D key to display the selected text. You will then be asked if you would like a hard copy. Pressing Y will send the selected text to the printer.

I would have preferred that the start of selected text be marked from the top of the screen rather than from the bottom, but I couldn't find a reliable way to correlate the location of a particular portion of text in screen memory to its location in the text buffer due to the inherent inconsistency of the text. The capability to adjust the start and end of selected text after it is marked should help.

If you find a BASIC listing in the text which you would like to download, find the starting address of the listing with Program 3. Type NEW and load Program 4. When this program is run, you will be prompted for the starting address of the listing. Enter the address and RETURN. Each of the listings will then appear briefly, one at a time, near the top of the screen. It may take awhile, depending on the length of the listing, but when it is done, your listing has become a program. You can now delete Program 4 from the end of your downloaded program and SAVE or RUN it.

When Program 4 reaches the end of a program listing, it terminates with an error message. This is due to the absence of a line number or valid BASIC statement. Although this does end the program at the proper point, maybe you can come up with a more elegant way to terminate execution.

Program 2

Line 2 conditions the interrupt service routine to sound an audible alarm when the text buffer is within 256 bytes of being filled. It also changes the IRQ Vector to point to the interrupt routine and sets upper/lowercase mode.

Line 3 moves the top of memory down to protect the machine language routines, lookup tables, and text buffers.

Line 4 resets the BASIC pointers which were moved when the programs were saved. This must

SJB DISTRIBUTORS. THE MOST COMPETITIVE PRICES ON COMMODORE.

commodore

NEW COMMODORE PRODUCTS

The Executive 64	Call
CBM 8128-80	\$ 825
CBM 8256-80	1095
CBM BX700	2990
8 Series Software	Call
CBM 1520 Plotter	169
CBM 1526 Printer	349

SOFTWARE FOR CBM 64K

BUSINESS

WordPro 3 1/4	
w/Spell Right Plus	\$ 79
Spell Right Plus	55
Calc Result (Advanced)	125
Calc Result (Easy)	75
Buscalc II	95
Mirage Concepts	
(Powerful Data Base)	95
M File (merge with WordPro)	89
Home Utilities	49
64 Mailing List (Saladic)	28
The Manager	50
Home Accountant (continental)	75
Code Writer	
(Writes Basic Programs)	95
Stock (Investment analysis)	80
Agricultural Management	Call
General Ledger, A/R, A/P, P/R, Inv.	Call

RECREATION

Assembler Package (cassette or disk, compiled, includes editor, loader, disassembler)	39
Sprite Master (access)	30
Neutral Zone (access)	35
Space Bell	19
Pet Emulator	30
Coco II (builds your own games)	40
Vic Tree (programmers utilities)	75
Micro-Term (save to printer/disk)	39
Hesman	35
Synthesound	45
Gothmog's Lair	30
Read Food	15
Commodore Games	Call

INTERFACES & ACCESSORIES

80 Column Expander	\$159
VIC 1600 Modem	95
VIC 1650 (auto answer, auto dial)	150
VIC 1525 Graphic Printer	225
VIC 1530 Datasheet Recorder	65
VIC 1541 Disk Drive	249
VIC Switch (connect 8 64's or Vics to printer, ds)	149

PET-IEEE cable	33
IEEE-IEEE cable (2m)	49
5 Slot Expander for 64	65
Parallel Interface (Epson, Okidata, IDS, NEC)	70
Programmers Reference Guide	18
Verbatim Diskettes (10 per box)	26
Hes Modem	75
ADA 145D	149
ADA 1800 (new)	129
Numeric Keypad	35

VIC PRODUCTS & ACCESSORIES

8K RAM Memory Expansion Cartridge	\$ 40
16K RAM	70
24K RAM	105
VIC 3 Slot Expander	27
VIC 6 Slot Expander	70
Garf (64 also)	30
Omega Race	30
Arcade Joystick - Heavy duty w/2 firing buttons! Great for the VIC or 64	25
Auto Clock	125

MONITORS - GREAT RESOLUTION (64 OR VIC)

CBM 1701 Color Monitor	\$ 249
Amdak Color Plus	299
Panasonic TR-120 (w/speaker)	155
Panasonic CT-160	279
8MC (green screen)	95
Video/Audio Cable	15

PRINTERS - LETTER QUALITY

CBM 6400, 40 cps	\$1450
Dialo 62D, 25 cps	949
Transfer 140 (serial)	1395
Transfer 130, 16 cps (auto load, wp features)	769
NEC 350D Series	1600
NEC 770D Series	2350

PRINTERS - DOT MATRIX

CBM 8023 15D cps/graphics	\$ 545
CBM 4023 Printer	395
Epson FX Printer, 18D cps	549
Epson MX-80 FT w/graphics	Call
Epson FX-100	859
Okidata 82A, 12D cps (serial and parallel)	429
NEC 8023A (parallel)	429
Okidata 92	559
Star Gemini, 10X	329
Star Gemini, 15	499
Transfer 315 (hi-res, color)	575

COMMODORE BUSINESS SERIES

SuperPet (5 languages, 2 processors)	\$1059
CBM 8032 Computer, 80 Column	625

CBM Memory Expansion, 64K	259
CBM 8050, 1 mg. Dual Drive	995
CBM 8050, 2 mg. Dual Drive	1295
CBM 0900, 5 mg. Hard Disk	1995
CBM 0900, 7.5 mg. Hard Disk	2250
CBM 2031, 170K Single Drive (New)	295
DC Hayes Smart Modem	220

BUSINESS SOFTWARE-8032

WordPro 4+ or 5+	\$ 309
InfoPro	219
Administrator	489
VisiCalc (expanded)	199
BPI A/R, G/L, Job Cost, Inventory, Payroll	\$6,325

MasterCard, Visa, Money Order, Bank Check

COO (add \$5) accepted.
Add 3% surcharge for credit cards.
In stock items shipped within 48 hours.
F.O.B. Dallas, Texas (Texas Res. add 5% tax)
All products shipped with manufacturer's warranty.
Prices are subject to change without notice.

TO ORDER CALL TOLL FREE 800-527-4893 800-442-1048

(Within Texas)
Business Hours
Mon.-Fri. 8 to 6, Sat. 10-2
Write for free catalog.

SOFTWARE OF THE MONTH

Mirage Concepts
Machine Language Data Base
2000 Characters PL Record
200 Fields Per Record
Multiple Files Per Disk

PRODUCT OF THE MONTH

INTERPOO (Intelligent IEEE
RS232, serial interface
for VIC or C64) \$ 179



SJB DISTRIBUTORS INC.

10522 Plano Road, Suite 206
Dallas, Texas 75238
(214) 343-1328

be done before editing or running any part of the program which contains variable names.

Line 5 opens a file to the RS-232 device and sets the baud rate at 300.

Line 20 sets up a zero page pointer to the start of the text buffer. The machine language subroutine then stores text in the buffer beginning at this location and increments once for each character up to the end of available RAM.

Line 40 calls the machine language subroutine loaded by Program 1 which receives data, prints it to the screen, stores it in memory, and sends data from the keyboard to the RS-232 channel. This loop will continue until the British pound sign key is pressed.

Line 125 turns off the out-of-memory alarm.

Lines 130 through 165 display a menu and call an appropriate subroutine, depending upon which menu item is selected.

Lines 170 through 200 are the subroutine which sends data to the printer.

Lines 220 through 240 are the subroutine which saves to tape all memory from the start of BASIC to the last location of data. This is accomplished by moving the start of variables pointer to the location pointed to by memory locations 1 and 2. This subroutine also ascertains whether or not the user is still logged on, continuing the program if he is and ending it if he isn't.

Program 3

Lines 10 through 28 display the instructions on the screen.

Line 30 sets the beginning of text memory and initializes the start of selected text.

Lines 40 through 130 mark the start and end of selected text.

Lines 140 through 150 print the selected text on the screen.

Lines 160 through 190 print out a hard copy of the selected text on the VIC printer.

Lines 200 through 220 are a subroutine which allows adjusting the start of selected text.

Lines 250 through 280 are a subroutine which allows adjusting the end of selected text.

Program 4

Line 60000 inputs the starting address in memory of the program listing.

Lines 60005 and 60010 clear the screen, print the characters which form the listing one at a time, and look for a carriage return character, signaling the end of a line of BASIC.

Line 60020 increments text memory by one and loops back to print the next character.

Line 60030 is executed when the end of a line of BASIC is detected. POKEing a carriage return into the keyboard buffer at this time causes the text on the screen to be centered as if input were

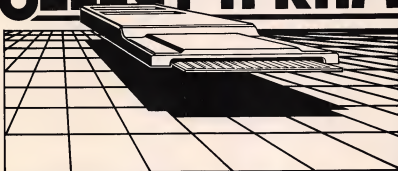
from the keyboard.

Program 4:

Data Tables And Machine Language

```
10 CK=0: FOR A=10240 TO 10495: READ D: CK
  =CK+D: POKE A,D: NEXT A
20 IF CK<>32753 THEN PRINT "DATA ERROR IN
  ": PRINT "LINES 100-410": STOP
30 PRINT "DATA LINES 100-410 OK"
40 CK=0: FOR A=7936 TO 8191: READ D: CK=C
  K+D: POKE A,D: NEXT A
50 IF CK<>29863 THEN PRINT "DATA ERROR IN
  ": PRINT "LINES 420-730": STOP
60 PRINT "DATA LINES 420-730 OK"
70 CK=0: FOR A=6144 TO 6655: D=PEEK(A+409
  6): CK=CK+D: POKE A,D: NEXT A
80 IF CK<>62616 THEN PRINT "DATA RELOCATI
  ON ERROR": STOP
90 PRINT "DATA RELOCATION OK": END
100 DATA 170, 170, 170, 170, 170, 170, 17
  0, 170
110 DATA 170, 170, 170, 170, 170, 13, 170
  , 170
120 DATA 170, 170, 170, 170, 8, 170, 170,
  170
130 DATA 170, 170, 170, 170, 170, 170, 17
  0, 170
140 DATA 32, 33, 34, 35, 36, 37, 38, 39
150 DATA 40, 41, 42, 43, 44, 45, 46, 47
160 DATA 48, 49, 50, 51, 52, 53, 54, 55
170 DATA 56, 57, 58, 59, 60, 61, 62, 63
180 DATA 64, 97, 98, 99, 100, 101, 102, 1
  03
190 DATA 104, 105, 106, 107, 108, 109, 11
  0, 111
200 DATA 112, 113, 114, 115, 116, 117, 11
  8, 119
210 DATA 120, 121, 122, 91, 92, 93, 94, 9
  5
220 DATA 170, 170, 170, 170, 170, 170, 17
  0, 170
230 DATA 170, 170, 170, 170, 170, 170, 17
  0, 170
240 DATA 170, 170, 170, 170, 170, 170, 17
  0, 170
250 DATA 170, 170, 170, 170, 170, 170, 17
  0, 170
260 DATA 170, 170, 170, 170, 170, 3, 16,
  {SPACE}17
270 DATA 19, 170, 170, 170, 170, 170, 170
  , 170
280 DATA 170, 170, 16, 170, 170, 170, 170
  , 170
290 DATA 170, 170, 170, 170, 170, 170, 17
  0, 170
300 DATA 170, 170, 170, 170, 170, 170, 17
  0, 170
310 DATA 170, 170, 170, 170, 170, 170, 17
  0, 170
320 DATA 170, 170, 170, 170, 170, 170, 17
  0, 170
330 DATA 170, 170, 170, 170, 170, 170, 17
  0, 170
340 DATA 170, 65, 66, 67, 68, 69, 70, 71
350 DATA 72, 73, 74, 75, 76, 77, 78, 79
360 DATA 80, 81, 82, 83, 84, 85, 86, 87
370 DATA 88, 89, 90, 170, 170, 170, 170,
  {SPACE}170
380 DATA 165, 2, 201, 127, 144, 13, 169,
  {SPACE}240
```

64K *for* VIC 20™ SELECT·A·RAM™



SELECT·A·RAM

STANDARD FEATURES

- 8K BLOCKS SELECTABLE FROM THE KEYBOARD OR BY SOFTWARE COMMAND
- TWO EXPANSION SLOTS
- WRITE PROTECTION
- RESET SWITCH
- EXPANDABLE TO 192K WITH ADDITION OF 64K EXPANSION MODULES
- COMPATIBLE WITH ROM CARTRIDGES
- ONE YEAR WARRANTY ON PARTS AND LABOR
- 15 DAY MONEY BACK GUARANTEE

SELECT-A-RAM\$169.
 64K EXPANSION MODULE\$149.
 TRADE-INS ACCEPTED
 3K \$5 8K \$10 16K \$20

VIC 20 IS A TRADEMARK
 OF COMMODORE ELECTRONICS LIMITED



APS-52A

52K MEMORY FOR ATARI 400/800 \$119.00

The APS-52A memory expansion boards come assembled and tested with a 90 day warranty covering materials and workmanship. Boards come with complete documentation including operation and installation instructions and a memory test program.

16K TRADE-INS ACCEPTED \$15.00

ATARI 400 AND 800 ARE TRADEMARKS
 OF ATARI, INC.

512-441-3202 PO BOX 43006 Austin, Tx. 78745-0001



APS
 ADVANCED-PROCESSOR-SYSTEMS



```

390 DATA 141, 11, 144, 169, 15, 141, 14,
[SPACE]144
400 DATA 76, 191, 234, 169, 0, 141, 14, 1
44
410 DATA 76, 191, 234, 170, 170, 170, 170
, 170
420 DATA 170, 170, 170, 133, 170, 170, 17
0, 170
430 DATA 20, 170, 0, 170, 170, 13, 170, 1
70
440 DATA 134, 135, 170, 136, 170, 170, 17
0, 170
450 DATA 170, 170, 170, 170, 170, 170, 17
0, 170
460 DATA 32, 33, 34, 35, 36, 37, 38, 39
470 DATA 40, 41, 42, 43, 44, 45, 46, 47
480 DATA 48, 49, 50, 51, 52, 53, 54, 55
490 DATA 56, 57, 58, 59, 60, 61, 62, 63
500 DATA 64, 193, 194, 195, 196, 197, 198
, 199
510 DATA 200, 201, 202, 203, 204, 205, 20
6, 207
520 DATA 208, 209, 210, 211, 212, 213, 21
4, 215
530 DATA 216, 217, 218, 91, 92, 93, 94, 95
540 DATA 32, 65, 66, 67, 68, 69, 70, 71
550 DATA 72, 73, 74, 75, 76, 77, 78, 79
560 DATA 80, 81, 82, 83, 84, 85, 86, 87
570 DATA 88, 89, 90, 59, 60, 61, 62, 20
580 DATA 162, 2, 32, 198, 255, 32, 228, 2
55
590 DATA 170, 240, 36, 166, 144, 208, 32,
41
600 DATA 127, 170, 189, 0, 25, 201, 13, 2
08
610 DATA 3, 32, 218, 25, 32, 210, 255, 160
620 DATA 0, 132, 212, 145, 1, 230, 1, 208
630 DATA 2, 230, 2, 234, 24, 144, 209, 32
640 DATA 204, 255, 169, 164, 32, 210, 255
, 169
650 DATA 157, 32, 210, 255, 162, 2, 32, 2
01
660 DATA 255, 32, 228, 255, 240, 7, 170,
[SPACE]189
670 DATA 0, 24, 32, 210, 255, 32, 204, 255
680 DATA 165, 197, 201, 6, 240, 3, 24, 144
690 DATA 167, 96, 168, 169, 32, 32, 210,
[SPACE]255
700 DATA 152, 96, 66, 67, 68, 69, 70, 71
710 DATA 72, 73, 74, 75, 76, 77, 78, 79
720 DATA 80, 81, 82, 83, 84, 85, 86, 87
730 DATA 88, 89, 90, 59, 60, 61, 62, 20

```

Program 2: Modem Save

```

1 PRINT"[CLR][5 SPACES]MODEM SAVE":PRINT:
FORI=1TO3000:NEXT
2 POKE6371,PEEK(56)-1:POKE788,224:POKE789
,24:POKE36869,194
3 POKE644,24:POKE52,24:POKE56,24
4 POKE45,72:POKE46,20:POKE47,72:POKE48,20
:POKE49,72:POKE50,20
5 OPEN2,2,3,CHR$(6)
20 POKE1,0:POKE2,26
30 PRINT"[CLR]"
40 SYS6528
125 POKE0,PEEK(2):POKE2,26
130 PRINT"[CLR]":PRINT"1. SAVE TO TAPE":P
RINT"2. PRINTER":PRINT"3. TAPE & PRIN
TER"
140 PRINT:PRINT"MAKE A SELECTION"

```

```

150 GET$=I$VAL$(S$)<I$VAL$(S$)>3THEN150
160 ONVAL$(S$)GOSUB220,170,170:IFA$="Y"THE
N20
165 END
170 OPEN4,4:FORK=B192TOPEEK(0)*256+PEEK(1
):PRINT#4,CHR$(PEEK(K)AND127):NEXT
190 IFS$="3"THEN210
200 RETURN
220 POKE45,PEEK(1):POKE46,PEEK(0):SAVE"MO
DEM DATA":POKE45,49:POKE46,20
225 PRINT"STILL LOGGED ON?(Y/N)"
230 GETA$=IFA$=""THEN230
240 RETURN

```

Program 3:

Text Search For Display Or Printout

```

5 PRINT"[CLR]":POKE56,26
10 PRINT"THE TEXT RESIDES IN":PRINT"MEMOR
Y STARTING AT":PRINT"LOCATION 6656":PR
INT
20 PRINT"PUSH [RVS]SPACE[OFF] TO START":P
RINT"AND STOP TEXT SEARCH":PRINT
24 PRINT
25 PRINT"PUSH [RVS]S[OFF] AND [RVS]E[OFF]
TO":PRINT"MARK START AND END":PRINT"O
F TEXT FOR DISPLAY":PRINT
28 PRINT"[RVS]D[OFF] DISPLAYS SELECTED":P
RINT"TEXT"
30 J=6656:SA=J
35 GETA$:IFA$<>" "THEN35
40 PRINTCHR$(PEEK(J)AND127):POKE212,0
50 GETA$:IFA$<>" "THENJ=J+1:GOTO40
60 GETA$:IFA$=""THEN60
110 IFA$="S"THENSA=J:PRINT:PRINT"ST
ART ADDRESS=";SA;"OK?":GOSUB200
120 IFA$="E"THENEA=J:PRINT:PRINT"EN
D ADDRESS=";EA;"OK?":GOSUB250
130 IFA$=""THENJ=J+1:GOTO40
140 IFA$<>"D"THEN60
150 PRINT:PRINT:PRINTSPC(4)"SELECTED TEXT
":FORI=SA:POKEA:PRINTCHR$(PEEK(I)AND127
):NEXT
160 PRINT:PRINT:PRINT"HARD COPY?(Y/N)"
170 GETA$:IFA$=""THEN170
175 IFA$<>"Y"THENEND
180 OPEN4,4:FORI=SA:POKEA:PRINT#4,CHR$(PEEK
(I)AND127):NEXT
190 PRINT#4:CLOSE4:END
200 GETB$:IFB$=""THEN200
210 IFB$<>"Y"THENINPUT"START ADDR.":SA:PR
INT"[RVS]SPACE[OFF] TO CONTINUE":RETU
RN
220 PRINT"[RVS]SPACE[OFF] TO CONTINUE":RE
TURN
250 GETB$:IFB$=""THEN250
260 IFB$<>"Y"THENINPUT"END ADDR.":EA:PRIN
T"PRESS [RVS]D[OFF] TO DISPLAY":RETUR
N
280 PRINT"PRESS [RVS]D[OFF] TO DISPLAY":R
ETURN

```

Program 4: BASIC Download

```

60000 PRINT"START ADDRESS OF":INPUT"PROGR
AM":I
60005 PRINT"[CLR][2 DOWN]"
60010 PRINTCHR$(PEEK(I)AND127):IFPEEK(I)
=13THEN60030
60020 I=I+1:GOTO60010
60030 PRINT"I="I+2:GOTO60005[HOME]:POKE
190,2:POKE631,13:POKE632,13

```

THE VIC LIBRARY FROM COMPUTE!

For over two years, *COMPUTE!* Magazine has been publishing articles and ready-to-type-in programs for VIC-20 owners. Many VIC programming techniques first appeared in the pages of *COMPUTE!*.

COMPUTE!'s editors have gathered the best articles (revising and rewriting some) and added previously unpublished material. The result is a series of books for VIC-20 owners. Each contains articles and programs which educate, explain, and entertain.

Whether you're brand-new to computing or a seasoned programmer, you'll find fun and useful information, written in *COMPUTE!*'s easy-to-understand style, in all of these books. And if you know other VIC owners, *COMPUTE!* books make wonderful Christmas gifts.

COMPUTE!'s First Book of VIC \$12.95

COMPUTE!'s First Book of VIC has been a number one best seller on the computer book lists. It has been called "useful for both novice and experienced VIC users."

If you like computer games, you will enjoy "STARFIGHT3," "ZAP!", "Meteor Maze," and the other games included. Chapters on joysticks and paddles explain how to use them in programs you write.

First Book of VIC shows you a simple way to alphabetize lists. And there are advanced programming techniques for saving memory space.

The custom character program allows you to design your own alphabet (if you want your VIC to print Hebrew, Greek, or other special characters). Custom characters can be developed into spaceships, flowers, and other unique shapes.

You will discover how to automatically renumber BASIC programs, combine two programs, start and stop the screen when it is LISTing, and dump the screen to a printer.

If you write programs, you will appreciate the discussion of VIC memory and how to create special effects with graphics and sound. The machine language monitor, TINYMON, is a valuable aid to machine language programmers.

COMPUTE!'s First Book of VIC was one of the first books published for VIC owners and it is still one of the best. VIC owners of all ages and abilities will find it an excellent resource.

COMPUTE!'s Second Book of VIC \$12.95

Your VIC library is not complete without *COMPUTE!'s Second Book of VIC*.

Some of the outstanding programs include: a datasette filing system that lets you use your VIC as a filing cabinet, a mini word processor, a loan analyzer that figures out interest, monthly paymeries, and loan values; a machine language assembler (and a very fast machine language game); a program for printing poster-sized banners; and much more.

Second Book of VIC features a detailed memory map (including Kernal routines) that not only names the memory locations, but also gives you ideas for using them in your programs.

Chapters on graphics and sound include a character editor that redefines character shapes, a sound effects program that does not slow down BASIC programs, and a utility for programming the eight function keys.

And, of course, there are ready-to-type-in games: "UXB," "A Day At The Races," and others. If you write your own games, you will benefit from the techniques and examples throughout the book.

People who are curious about the many things you can do with a VIC need *COMPUTE!'s Second Book of VIC*. The variety of programs will be a welcome source of new software. Why not order your copy today?

COMPUTE!'s First Book of VIC Games \$12.95

Would you like a lot of games at a very low price? *COMPUTE!'s First Book of VIC Games* contains two dozen (for only \$12.95). Each game has been tested and debugged, and is ready to type into your VIC-20.

You get fast-action, commercial quality, arcade-style games that require quick reflexes in addition to strategy games which test your logical skills.

In "Time Bomb" you hear the ticking of a bomb about to blow up. You have to find and defuse it by making your way through the maze that extends beyond the borders of the screen.

"Closeout!" takes you to a department store. You try to snatch as many sale items as possible, while avoiding the horde of nasty bargain hunters.

"Cryptic Numbers" combines logic and luck. Thinking logically, you have to decode the pattern picked by the VIC. After each turn you learn how close you were.

"Deflector" requires quick reactions and a sense of strategy. You control the bouncing ball by placing deflectors that direct it to the targets.

You are captain of a small space fortress in "Outpost." You have lasers and torpedoes, but your energy is running low and the computer is on the blink. Will the supply ship arrive in time to save you?

First Book of VIC Games is more than just a book full of program listings. Each game is annotated. You can change the program if you like, or use the many programming techniques in games you write. And you can use the maze-drawing program in your own games.

Introductory chapters explain how to develop ideas for game programs, with hints and tips about the VIC's sound, color, and graphics capabilities.

No serious game player should be without *COMPUTE!'s First Book of VIC Games*.

NEW RELEASES

[Coming Soon from *COMPUTE!* Books]

Creating Arcade Games on the VIC
VIC Games for Kids
Things to Do in 4K or Less

HOW TO ORDER

COMPUTE! Books are available at bookstores, newsstands, and computer stores nationwide. If your local store has run out of *COMPUTE!* Books or does not carry them, you can order them directly.

— By Mail

Send a check or money order in U.S. funds [no cash please] to

Order Department
COMPUTE! Books
P.O. Box 5406
Greensboro, NC 27403

Please include \$2 shipping/handling for each book you order. All orders must be prepaid [C.O.D. orders are not accepted]. Allow 4-6 weeks for delivery.

— By Phone

If you have VISA, MasterCard, or American Express, call our toll-free number 800-334-0868 (919-275-9809 in NC) between 8:30 AM and 4:30 PM, EST. Your order will be processed promptly; we will bill your credit card [plus \$2 shipping/handling]. Allow 4-6 weeks for delivery.

COMPUTE! Publications, Inc. 

A subsidiary of American Broadcasting Companies, Inc.

© 1983. Commodore and VIC-20 are trademarks of Commodore Electronics.

Termulator For The 64

Gordon C. Lyman

"Termulator" is a speedy, machine language program which emulates a terminal program. It thus gives you an alternative if you find BASIC terminal programs too slow or if you cannot find suitable programs available commercially. You don't need to know machine language to type in and use this program. Termulator is limited to full duplex operation.

After buying a Commodore 64 computer and a VICmodem, I soon discovered that the terminal program supplied with the VICmodem would not run on the 64. I tried using a terminal program written in BASIC, but found it too slow for my purposes. Also, I could not find a terminal program offered for sale for the 64, so I wrote "Termulator" (terminal emulator), a machine language program which is quite simple in operation.

Basically, the program gets a character from the keyboard, sends the character via modem, receives a character from the modem, and finally displays it on screen. This simple logic limits the program's ability to full duplex operation; however, I have never required anything but full duplex operation. The program utilizes RAM in the range \$0900-\$8500 as a receive buffer, storing the text displayed on the screen into memory. Termulator consists of three basic sections: initialization, main loop, and cursor subroutine. Let's look at each one in some detail.

Initialization (\$C000-\$C048)

Termulator uses the Kernal routine "CLALL" (\$FFE7) to close all files, just in case any have been left open. Next, the value \$00 is stored in the RS-232 command register (\$0294) and the value \$06 is stored in the RS-232 control register (\$293).

The next instructions set up a filename for the modem file. The location of the filename is loaded into the X and Y registers, and the length of the name is loaded into the accumulator. Now the important part: the first two bytes of the modem filename must be the RS-232 control and command registers. Then, by using the Kernal routine "SETNAM" (\$FFBD), the RS-232 interface

is instructed to operate according to the RS-232 control and command registers. In this case, the RS-232 interface will operate at 300 baud, with no parity checking, one stop bit, and an eight-bit word length. In order to change these, you must change the values that are loaded into these registers. For further explanation, see the *Commodore 64 Programmer's Reference Guide*.

A pointer in the zero page of memory is initialized to the start of the receive buffer. This buffer starts at \$0900 in order to leave a cushion between the start of BASIC at \$0800 and the buffer area. The pointer will be used by the main routine to store the text received into this buffer for future manipulations. The limit of memory pointer is reset in order to protect the file buffers which will be allocated when opening a file for the modem. The limit of memory pointer is also set low enough to protect a monitor or other program stored within the top 6656 bytes of RAM.

The program next sets up the logical first and secondary addresses and opens the modem file. This automatically allocates 512 bytes at the top of free RAM for input and output buffers. The accumulator is loaded with the file number, the X register is loaded with the device number, and the Y register is loaded with the secondary address, which would be a command to the modem. The value \$FF loaded into the Y register means no command to the device. Then the "SETLFS" (\$FFBA) and "OPEN" (\$FFC0) Kernal routines are called.

The ASCII data from \$C0F4 is displayed until a zero value is found. This includes the character codes to change to upper/lowercase and display white characters, as well as a title message.

The Main Loop (\$C04A-\$C0BF)

The Kernal routine "STOP" (\$FFE1) is called, which will return a \$00 in the accumulator if the stop key is pressed. If the stop key is pressed, all files are closed and the program stops; otherwise, the program branches to set the input device to device number 0 (the keyboard).

COMMODORE 64 PROGRAMS

BUSICALC 3

**BUSINESS
CALCULATION
PROGRAM**

\$129

The "TRUE 3-D"
Electronic Spreadsheet
for the Commodore 64

BUSICALC 1

**BUSINESS
CALCULATION
PROGRAM**

\$69

A "BEST BUY"
Electronic Spread Sheet
for all Commodore's

BUSICALC 2

**BUSINESS
CALCULATION
PROGRAM**

\$99

The MOST CAPABLE
Electronic Spread Sheet
for the Commodore 64

WE'RE HERE!



Skyles Electric Works
231E South Whisman Road
Mountain View, CA 94041
(415) 965-1735

AVAILABLE NOW! Call 800 227-9998**

For the name of your nearest dealer,
detailed information or a catalog of products.

**California, Canada and Alaska, please call (415) 965-1735.

In Europe: SUPERSOFT, Winchester House, Canning Road, Harrow Wealdstone, England HA3 7SJ, Tel. 01 861 1166

The Kernal routine "GETIN" (\$FFE4) is used to return one byte from the keyboard buffer as an ASCII value in the accumulator. If the keyboard buffer was empty, a \$00 is returned and the program will branch to the modem input routine. Otherwise, the ASCII value from the keyboard is stored in a zero page location (\$6A) for later processing. The ASCII value from the keyboard is translated into standard ASCII by selecting the corresponding value from a list, 256 bytes long, starting at \$C226. This is required because Commodore ASCII is not the same as standard ASCII. Also in this list of data are the ASCII values for the Control A through Control Z. When you wish to send a control character while using the program, type the appropriate letter key while holding down the Commodore key. Another list, starting at \$C126, contains the Commodore ASCII for the reverse translation. The Kernal routine "CHROUT" (\$FFD2) is used to send the byte, now in the accumulator, over the modem.

The Kernal routines "CHKIN" (\$FFC6) and "CHRIN" (\$FFE4) are used to input a byte from the modem. Then this byte, which is standard ASCII, is translated to Commodore ASCII and stored in zero page (at \$6A).

If the value returned from the modem was null (\$00), the program will branch back to the beginning of the main routine.

To erase the cursor before outputting to the screen, a space and cursor-left are displayed. Then the byte that was received from the modem is printed on the screen.

A check is made to see if the character received, now in the accumulator, is a delete. If it is, the receive buffer pointer is decremented and the program returns to the start of the main loop; if not, the receive buffer pointer is incremented. If the pointer has reached the limit of memory pointer, it is reset to \$0900. The character is stored in the receive buffer, and the program returns to the start of the main loop.

The Cursor Subroutine (\$C0C0-\$C0F3)

The least significant byte of the Commodore 64's jiffy clock is used as a timer for the cursor. This byte is compared to the value \$15, which is the length of time the cursor takes to flash on or off. By changing this value in location \$C0C3, you can change the speed at which the cursor flashes. If the timer has not expired, then the RTS instruction at \$C0C6 will return to the main routine.

If the timer has expired, it is reset and a flag stored at \$6B is checked. This flag will be either \$00 or \$FF. If the flag is set to \$FF, it will be cleared to \$00 and a space which turns the cursor off will be displayed.

If the flag was clear, then the program branches to set the flag to \$FF and displays a re-

versed space which turns the cursor on. After the cursor is turned either on or off, a cursor-left is displayed. This is done so that the next thing displayed will be in the right position. The program then returns to the main routine.

How To Use Termulator

Type in and RUN Program 1, which is a BASIC program that will load the machine language for Termulator into RAM. If any errors are detected, it will display the message ERROR IN BLOCK # x. You will need to check from \$C300 to \$C337 by hand. If no errors are found, the program is ready to run. Just type SYS 49152.

Once you've got a working version of Termulator, you can eliminate the trouble of having to run the BASIC loader program again by making a copy of the machine language on tape or disk. To do this, you'll need either a monitor program or a program like "Machine Language Saver" (COMPUTE!, June 1983). SAVE the contents of memory from 49152-49976 (\$C000-\$C338). When you reload the machine language, you start the program just as before, by typing SYS 49152.

Alternatively, you could use Program 2. This POKES in a short routine which creates a tape copy of the Termulator machine language. Type in and RUN Program 2, insert a blank tape in the dataset, and type SYS 52736. You should see on your screen the prompt PRESS PLAY & RECORD ON TAPE, at which point you are ready to make the copy. You can reload Termulator from this tape by typing LOAD " ",1,1.

Program 1: Termulator - BASIC Loader

```
100 FOR M=49152 TO 49975
110 READ D:POKE M,D:NEXT
120 FOR L=0 TO 11
130 LN=L*70+49152
140 FOR C=0 TO 69
150 IF LN+C>49975 THEN 180
160 T=T+PEEK(LN+C)
170 NEXT C
180 READ CS
190 IF CS<T THEN PRINT"ERROR IN LINES":LN:
  -":LN+63:STOP
200 T=0:NEXT L
210 PRINT"[3 DOWN]TERMULATOR LOADED SUCCESSFULLY[2 DOWN]"
220 PRINT"TYPE SYS 49152 TO START"
230 END
49152 DATA 32,231,255,169,0,141,148
49159 DATA 2,169,6,141,147,2,169
49166 DATA 0,133,97,133,99,169,9
49173 DATA 133,98,169,133,133,56,169
49180 DATA 2,162,147,160,2,32,189
49187 DATA 255,169,128,162,2,160,255
49194 DATA 32,186,255,32,192,255,169
49201 DATA 240,141,32,208,169,240,141
49208 DATA 33,208,162,0,189,244,192
49215 DATA 240,9,32,210,255,232,76
49222 DATA 60,192,234,234,32,225,255
49229 DATA 208,4,32,231,255,0,162
49236 DATA 0,134,153,32,228,255,240
```

READ THE LABEL

THE FILING ASSISTANT

DATA BASE MANAGEMENT for the COMMODORE 64
This data management package allows you to create record formats, sort information, and produce reports. It includes the following features:

- Design records up to 256 characters, up to 25 fields, (up to 35 characters per field)
- Designate up to 10 two-level sorts
- "Step through" records while displaying selected fields to screen

- Add, copy, change, or delete records
- "Find" a record by key field, or "locate" by record number
- Set function keys to insert a frequently used word, phrase, zip code, etc.

No programming or code necessary. On-screen prompts lead to full operation in one to two hours.

THE FILING ASSISTANT contains a built-in mail label program that allows you to print a 1 to 6 line label. You can include more than one field per line and print up to four labels across the page. Labels to be printed can be selected on one or more fields.

The program also allows you to design your own report formats. Your reports may include:

- Automatic record counting
- Computation between fields
- Totals and/or sub-totals per column
- Record selection by one or more fields

TECHNICAL NOTE

This program supports the serial or the user port —you can configure just about any printer. It can be used with more than one 5 $\frac{1}{4}$ " disk drive or with the "C-64 Lock-IEEE Interface" which allows you to work with the Commodore 2031, 4040, and 8050 disk drives.

THE FILING ASSISTANT is part of a series. It will integrate with **THE WRITER'S ASSISTANT** (word processing) and **THE SPREADSHEET ASSISTANT** (forecasting and financial analysis). Even if you are a beginner **THE FILING ASSISTANT** will allow you to manage personal and business records. The **ASSISTANT SERIES** provides you with the most complete and practical information management package available for the

Commodore 64

RAINBOW
Computer Corporation

490 Lancaster Pike
Frazee, Pennsylvania 19055

```

49243 DATA 22,133,106,201,133,208,3
49250 DATA 32,55,195,162,128,32,201
49257 DATA 255,166,106,189,55,194,32
49264 DATA 210,255,162,128,32,198,255
49271 DATA 32,220,255,170,189,55,193
49278 DATA 133,106,162,3,134,154,32
49285 DATA 192,192,165,106,240,191,169
49292 DATA 32,32,210,255,169,20,32
49299 DATA 210,255,165,106,32,210,255
49306 DATA 201,20,208,11,164,99,208
49313 DATA 2,198,98,198,99,76,74
49320 DATA 192,230,99,208,12,230,98
49327 DATA 164,98,196,56,208,4,160
49334 DATA 9,132,98,164,99,145,97
49341 DATA 76,74,192,165,162,201,21
49348 DATA 16,1,96,160,0,132,162
49355 DATA 164,107,240,12,160,0,132
49362 DATA 107,169,32,32,210,255,24
49369 DATA 144,19,160,255,132,107,169
49376 DATA 18,32,210,255,169,32,32
49383 DATA 210,255,169,146,32,210,255
49390 DATA 169,157,32,210,255,96,5
49397 DATA 14,147,17,17,17,17,17
49404 DATA 17,32,32,32,32,32,32
49411 DATA 32,212,197,210,285,45,213
49418 DATA 45,204,193,212,207,210,32
49425 DATA 32,157,157,13,13,32,32
49432 DATA 32,32,32,32,32,32,32
49439 DATA 32,66,89,32,199,46,32
49446 DATA 204,89,77,65,78,13,13
49453 DATA 13,0,234,0,0,0,0
49460 DATA 0,0,0,0,0,0,137
49467 DATA 0,0,0,0,0,20,0,0
49474 DATA 0,0,13,0,0,146,134
49481 DATA 0,138,0,0,0,0,0
49488 DATA 0,0,0,0,0,0,0
49495 DATA 32,33,39,35,36,37,38
49502 DATA 39,40,41,42,43,44,45
49509 DATA 46,47,48,49,50,51,52
49516 DATA 53,54,55,56,57,58,59
49523 DATA 60,61,62,63,64,193,194
49530 DATA 195,196,197,198,199,200,201
49537 DATA 202,203,204,205,206,207,208
49544 DATA 209,210,211,212,213,214,215
49551 DATA 216,217,218,91,92,93,94
49558 DATA 95,0,65,66,67,68,69
49565 DATA 70,71,72,73,74,75,76
49572 DATA 77,78,79,80,81,82,83
49579 DATA 84,85,86,87,88,89,90
49586 DATA 0,0,0,0,0,0,0
49593 DATA 0,137,0,0,0,0,0,20
49600 DATA 0,0,0,0,13,0,0
49607 DATA 146,134,0,138,0,0,0,0
49614 DATA 0,0,0,0,0,0,0
49621 DATA 0,0,32,33,34,35,36
49628 DATA 37,38,39,40,41,42,43
49635 DATA 44,45,46,47,48,49,50
49642 DATA 51,52,53,54,55,56,57
49649 DATA 58,59,60,61,62,63,64
49656 DATA 193,194,195,196,197,198,199
49663 DATA 200,201,202,203,204,205,206
49670 DATA 207,208,209,210,211,212,213
49677 DATA 214,215,216,217,218,91,92
49684 DATA 93,94,95,0,65,66,67
49691 DATA 68,69,70,71,72,73,74
49698 DATA 75,76,77,78,79,80,81
49705 DATA 82,83,84,85,86,87,88
49712 DATA 89,90,0,0,0,0,0
49719 DATA 0,0,0,0,0,0,0
49726 DATA 0,0,0,0,0,0,13
49733 DATA 0,0,0,0,0,0,0
49740 DATA 0,0,0,0,0,0,0
49747 DATA 0,0,0,0,32,33,34
49754 DATA 35,36,37,38,39,40,41
49761 DATA 42,43,44,45,46,47,48
49768 DATA 49,50,51,52,53,54,55
49775 DATA 56,57,58,59,60,61,62
49782 DATA 63,64,97,98,99,100,101
49789 DATA 102,103,104,105,106,107,108
49796 DATA 109,110,111,112,113,114,115
49803 DATA 116,117,118,119,120,121,122
49810 DATA 91,92,93,94,95,0,0
49817 DATA 0,0,0,0,0,0,0
49824 DATA 0,0,0,0,0,0,0
49831 DATA 0,0,0,0,0,0,0
49838 DATA 0,0,0,0,0,0,0
49845 DATA 0,0,0,0,0,0,0
49852 DATA 3,17,19,0,3,19,0
49859 DATA 0,0,0,0,0,0,16
49866 DATA 0,0,0,0,0,0,0
49873 DATA 0,0,0,0,0,0,0
49880 DATA 11,9,20,0,7,0,13
49887 DATA 0,0,14,17,4,26,19
49894 DATA 16,1,5,18,23,8,18
49901 DATA 12,25,21,15,0,6,3
49908 DATA 24,22,2,0,65,66,67
49915 DATA 68,69,70,71,72,73,74
49922 DATA 75,76,77,78,79,80,81
49929 DATA 82,83,84,85,86,87,88
49936 DATA 89,90,0,0,0,0,0
49943 DATA 0,0,0,0,0,0,0
49950 DATA 0,0,0,0,0,0,0
49957 DATA 0,0,0,0,0,0,0
49964 DATA 0,0,0,0,0,0,0
49971 DATA 0,0,0,0,0,96
50000 DATA 9342,10115,8611,7872,2344,7993
50010 DATA 2536,8449,1657,3439,1123,1416

```

Program 2: Terminator - Tape Copy

```

100 FOR N=52736 TO 52760
110 READ D:POKE M,D:CK=CK+D:NEXT
120 IF CK<3515 THEN PRINT"ERROR IN DATA
[SPACE]STATEMENTS":STOP
130 PRINT"[2 DOWN]INSERT TAPE AND TYPE"
140 PRINT"[DOWN][5 RIGHT]SYS 52736"
150 END
160 DATA 162, 1, 32, 106, 255, 169, 0
170 DATA 133, 106, 32, 219, 255, 169, 192
180 DATA 133, 107, 169, 106, 162, 69, 160
190 DATA 195, 32, 216, 255

```

C-64/VIC 20/PET/CBM OWNERS

ROAOTOAO

• Hop your load across 5 lanes of traffic, avoid deadly snakes, and dodge the dreaded load-slitters. Cross a raging river full of logs, turtles, alligators, and perk your load in the safety of a harbor. Each time you park 5 loads, you enter a tougher level where the action is faster and the load patterns are more numerous. ROAOTOAO is written in machine language and uses high resolution graphics. The sound effects are excellent and you can use a joystick or the keyboard to control your load.

CASSIOVIC-20C-64

(Includes Shipping/Handling) \$19.95

(CALIF. REG. ADD 6% SALES TAX)

CHICKEN CHASE

• Help your hapless hen avoid hungry chicken hawks, sneaky coyotes, and fiendish crows. If your chicken gets into trouble, "bayer-ben" to a new spot on the maze. If your chicken travels the entire maze, you advance to the next level where the action is faster and the predators more numerous. Hi-res graphics, great sounds, and machine language help make CHICKEN CHASE a hilarious fun filled game for the whole family.

CASSIOVIC-20C-64

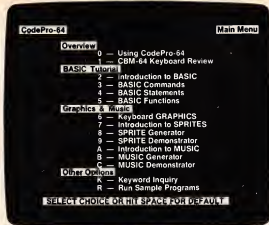
(Includes Shipping/Handling) \$19.95

(CALIF. REG. ADD 6% SALES TAX)

Write For
FREE
Catalog

NIBBLES & BITS, INC.
P.O. BOX 2044
ORCUTT, CA 93465

Write For
FREE
Catalog



NEW! For the Commodore 64™ ANNOUNCING

CodePro-64™

A new concept in
interactive visual
learning . . .

Now you can learn to code in BASIC and develop advanced programming skills with graphics, sprites and music—**visually**. You learn by interacting with CodePro-64, a new concept in interactive visual learning.

SEE PROGRAM EXECUTION

Imagine actually seeing BASIC statements execute. CodePro-64 guides you through structured examples of BASIC program segments. You enter the requested data or let CodePro-64 do the typing for you. (It will not let you make a mistake.)

After entering an example you invoke our exclusive **BasicView™** which shows you how the BASIC program example executes.

You step through and actually see the execution of sample program statements by simply pressing the space bar. CodePro-64 does the rest.

You see statements with corresponding **flow chart** graphics and variable value displays. You learn by visual examples.



EXTENSIVE TUTORIAL

CodePro-64's extensive tutorial guides you through each BASIC command and program statement and function. You get clear explanations. Then you enter program statements as interactive examples. Where appropriate you invoke BasicView to see examples execute and watch their flow charts and variables change.

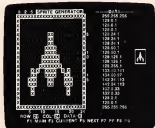
By seeing graphic displays of program segment execution you learn by visual examples. You learn **faster and grasp programming concepts easier** with CodePro-64 because you immediately see the results of your input.

You control your learning. You can go through the tutorial sequentially or return to the main menu and select different topics, or use **keywords** to select language elements to study. You can page back and forth between screens within a topic at the touch of a function key.

CodePro-64 lets you follow your interests and practice with interactive examples. But you can never get 'lost'. F1 will always return you to the main menu. Once you have practiced and mastered the BASIC language elements you move on to more advanced concepts. You learn about sprite and music programming.

SPRITE GENERATOR & DEMONSTRATOR

CodePro-64's sprite generator lets you **define your own sprites** on the screen. You learn how to define sprites and what data values correspond to your sprite definitions. (You can then use these values to write your own programs.) You can **easily experiment** with different definitions and make changes to immediately see the effects.



We also help you learn to program with sprites by giving you a **sprite demonstrator** so you can see the effect of changing register values. You can experiment by moving your sprite around in a screen segment, change its color or priority, and see the effects of your changes. You learn by visual examples.

MUSIC GENERATOR & DEMONSTRATOR

To teach you music programming CodePro-64 gives you an interactive music generator and demonstrator. First we help you set all your SID parameters (attack/decay, sustain/release, waveform, etc.). Then you enter notes to play and we show you **how graphically** as it plays, note by note, on the scale. You learn by seeing and hearing the results of your input.

OUR GUARANTEE

We guarantee your satisfaction. You must be satisfied with CodePro-64 for the Commodore-64. Try it for 10 days and if for any reason you are not satisfied return it to us (undamaged) for a full refund. **No risk.**



Our music demonstrator lets you experiment with various combinations of music programming parameters and hear the results. You can **quickly modify any of the SID register values** to hear the effects of the change. For example, you could easily change waveform and attack/decay values while holding all other SID values constant. By seeing your input and hearing the result you quickly learn how to create new musical sounds and special sound effects.

AND MORE . . .

We don't have enough space to tell you everything CodePro-64 offers. You need to see for yourself! BASIC tutorials, graphics, sprites, music, keyboard review, sample programs—the main menu shown above gives you just a summary of the contents of this powerful educational product.

Whether you're a beginning programmer or an experienced professional CodePro-64 will help you improve your Commodore-64 programming skills. We're sure because CodePro-64 was developed by a team of two professionals with **over 25 years** of software development experience.

CodePro-64 is a professional quality educational program for the serious student of personal computing. And it's **fully guaranteed**. Order yours today.

HOW TO ORDER

Order your copy of CodePro-64 today by mail or phone. Send only \$59.95 plus \$3.00 shipping and handling to:

SYSTEMS MANAGEMENT ASSOCIATES
3700 Computer Drive, Dept. C
Raleigh, N.C. 27609

Please specify tape or diskette version. MasterCard/VISA accepted. For faster service on credit card orders call (919) 787-7700.

Commodore 64 is a trademark of Commodore Business Machines, Inc.
As to 733, Copyright 1983, SMA
Dealer inquiries invited.

PROGRAMMING THE TI

C. Regena

Answers To Common Questions

I have appreciated your comments and feedback. Your letters help me in several ways to write a better column. I thought this month I would try to answer some general questions that I frequently see. Most of the questions concern peripherals or debugging, so I'll discuss these two main topics this month.

Do You Really Need Peripherals?

Peripherals are anything extra that you add on to your computer. To use your TI-99/4A, all you really need is the computer itself, a television or monitor so you can see what you're doing, the cord to connect the television and the computer, and the power cord (these cords are included with the computer). If you are writing your own programs, purchasing programs on cassette, or typing programs from magazines, you will need a cassette recorder and a cassette cable. You can use just about any kind of cassette recorder, but the TI Program Recorder is more reliable. The TI-99/4A console seems quite sensitive to the setting of the volume control. Your recorder does need to have a volume control and a tone control. Your *User's Reference Guide* tells how to use the cassette recorder.

To save a program you've written or typed in, use the command SAVE CS1 then press ENTER and follow the cassette instructions. To load a purchased program or a previously saved program, use OLD CS1 and follow the instructions. After you have pressed STOP on the cassette and ENTER on the keyboard, wait for the cursor to return (it may take a few seconds on longer programs), then type RUN to start the program.

By the way, as you are typing in a program, it's a good idea to SAVE your program every 20 minutes or so. It's a disaster to have a program all typed in after hours of effort, then have a sudden power failure that wipes out your program. I al-

ways use two cassettes and alternate them during the SAVE procedure just in case the power fails while I'm saving the program.

Most of my writing is for unexpanded computers with no peripherals other than the cassette. TI computers are very powerful machines just as they are, and I like to show readers how much they can do without investing any more money. The TI has many nice features and a very powerful built-in BASIC. The average household or educational user will not need any peripherals to enjoy and use the TI.

What Do You Buy First?

Many computer users soon want to do even more with their computers and begin to add peripherals. Many readers ask what peripherals to buy, and I can't really answer that because it depends on what you want to do with the computer. I added a printer first because I needed (wanted) listings of the programs I was writing. Other people can't live without a disk drive, so that's their first purchase.

There are many, many brands of printers available. To use a printer with the TI you need the RS-232 interface; just make sure your printer is RS-232 compatible. My first printer was an old teletype. If you need to make a cable to connect the printer to the RS-232, the RS-232 manual has the pin connections and all the configuration information. My next printer included the cable – so work with your dealer to make sure you have everything you need.

It is still possible to use just the RS-232 without the peripheral box (known as the "old-style" peripheral system). If the only peripheral you will need is the RS-232, it is unnecessary to buy the Peripheral Expansion Box plus the RS-232 Interface Card. In fact, if you have the Peripheral Box, you can use the old-style RS-232 or the RS-232

The Doryt Connection: Because you shouldn't have to pay for something you don't need.

**Paraprint 18A can save TI-99/4A
users up to \$300.**

Our Paraprint 18A interfaces between the TI-99/4A and any parallel printer, eliminating the need for the TI Peripheral Expansion Box and the RS-232 Interface Card. It plugs directly into the TI-99/4A, is fully compatible and provides daisy chain connection for TI peripherals. And our price is only \$105, so you save up to \$300 in the bargain!

Doryt also provides savings on additional 32K memory. Ours costs only \$175 and you don't have to buy the Peripheral Expansion Box. Plus it plugs directly into the TI-99/4A, is fully compatible with all TI software and provides daisy chain connection for peripheral units.

As a further service, Doryt can provide an economical printer for the system.

Buy the Doryt 18A, 32K memory, printer, and our interconnecting cable and save an additional \$50 on the total package! Call collect (516) 676-7950.

Doryt Systems, Inc.

14 Glen Street
Glen Cove, N.Y. 11542
(516) 676-7950.

Dealer inquiries invited.

TI-99 / 4A OWNERS Learn at Home • No Classes

Looking for instructional material that does more than just teach commands? Here's a true "How To" course that provides in-depth information on: How to structure complete programs, what the "Error Messages" don't say, How to build and use data files and arrays, practical sorting of alpha/numeric lists, maximum utilization of your 16K capability, graphics, sound and more... invaluable for beginners! Sophisticated and unique approaches for advanced programmers.

Plus, enough fully documented and complete programs to form the basis for your own personal software library, including game programs, educational programs, and useful household programs.

AMLIST, Inc.

Free Program,

Basic
TIPS

CALL TOLL FREE 1-800-241-6083

4542 Memorial Dr. #202
Atlanta, GA 30332 (404) 292-0576

COMPUTERIZED GIVEAWAY TEXAS STYLE

A Contest for TI 99/4A Owners

HOWDY FARMER! How would you like a chance to expand your computer system or software library **ABSOLUTELY FREE!** For the mere cost of a stamp and postcard, you cowboys and cowgirls can have a chance to win a valuable peripheral or hundreds of dollars worth of software. We sure to throw your hat into the ring to round up one of these fabulous prizes. Enter as often as you like. Don't delay! For an official entry form send your name and address to: **TEXAS ASSOCIATES**, 350 First North St., Washington, D.C. 20003, or circle the reader service card number: **CONTEST ENDS DECEMBER 30. RETAIL VALUE OF PRIZES IS OVER \$1,750.00.**

Sponsored by

TEXAS ASSOCIATES

In Cooperation With
**Doryt
Systems, Inc.**

Doryt's **Paraprint** COMPUTER CONNECTION



NEW FOR THE TI99/4A

Catch the excitement of...

Moonbright Tower™



**an epic adventure in
extended basic - 16K**

Unique "Multi-Program" design gives you over 48K of adventure excitement, and it runs in only 16K! **\$1995** on disk

Order "Moonbright Tower" and get our new RPG Character Generator & RPG Data Management utility for only \$9.95

or send Check or Money Order to:

**CINQUÉDEA
SOFTWARE**



214 Indian Creek Drive, Pekin, Illinois 61654

card. If you have the old-style RS-232, just plug the Peripheral Box flex cable into the side of the RS-232.

Using the Peripheral Expansion Box is the present method of adding on peripherals to the TI. Inside the box are slots for various cards. There is also room for one disk drive to be inside the box. You may add cards as they become available (or as you can afford them or need them).

A disk drive can be used in many ways. To add a disk drive you also need the Disk Controller box or the Disk Controller card and the Peripheral Expansion Box. The main advantage of a disk system over a cassette system is speed. You may SAVE programs on disk just as on cassette. A full-memory program may take about 3 minutes to load with cassette but only about 20 seconds with the disk system. The disk system is also much faster on any file processing, and thus practically a necessity for business programs. Many business programs require two disk drives. One disk controller can control up to three disk drives. Disk systems are possibly undesirable for some home use or for use in elementary schools because the cassette system is easier for children to use, less expensive, and not as fragile.

The 32K Memory Expansion is available either as a separate box or as a card to go in the Peripheral Expansion Box. One irate reader wrote that in my January column I did not mention that to add the Memory Expansion you also have to buy the Peripheral Expansion Box. The answer is that the Memory Expansion is still available separately in a box that attaches to the side of the computer. The Peripheral Expansion Box is the best way to go if you are adding several peripherals, but if you need only one unit the "old-style" still works. The 32K Memory Expansion does require a command module that can access it. You cannot use the Memory Expansion with the built-in BASIC. TI Extended BASIC and Logo are examples of two of the modules that can use the Memory Expansion.

Computer Enhancements

A modem allows telecommunication – you can connect your computer through telephone lines to another computer such as a large data base or a mainframe "host" computer. Your home computer thus acts as a terminal. To use a modem you'll need the RS-232 Interface and the Terminal Emulator command module. The RS-232 has two ports so you can interface with both a printer and a modem. There are two terminal emulator command modules, and either one will work. They contain the software necessary to set up the communications. Terminal Emulator II also contains speech capabilities, so it is a dual-purpose module. There are many brands of modems and telephone

couplers; you just need to make sure the one you use is RS-232 compatible.

The Speech Synthesizer is the peripheral that makes the computer talk. With the "free speech" offer (buy six command modules and get the Speech Synthesizer free), every home with young children should get one. The speech feature adds an extra touch to educational programs. To enable the computer to talk, you need a command module that has speech capabilities.

To program your own speech, you'll need Terminal Emulator II. Words are pronounced phonetically, or you can use numbered allophones, so programming speech takes some experimentation. You can also use the TI Extended BASIC module, but this module has limited speech – only a certain vocabulary (and variations of those words) can be used.

Wired Remote Controllers are available for games or for educational programs. The TI version comes as a pair of joysticks for two-player games.

With a Hex-Bus adapter you can save a program with the Texas Instruments Compact Computer 40 (CC-40) onto wafertape, then load it onto the TI-99/4A.

Alternatives To BASIC

Several languages are available for the TI-99/4A. TI Extended BASIC is probably the first one I would get for someone who likes to program. Extended BASIC comes as a command module, and no extra peripherals are required. Extended BASIC allows multistatement lines, actual subprograms, and complex IF-THEN-ELSE logic. If you like to convert programs from other versions of BASIC, Extended BASIC makes it a little easier. Another feature of Extended BASIC is the DISPLAY AT command to print at a specific location on the screen – and the PRINT USING command allows formatting, which makes it easier to print reports or line up numbers in a column of numbers.

Another main feature of Extended BASIC is sprite capability. You may custom design your own objects just like in TI BASIC, but then you can place the sprite on the screen, designate a color, and put the sprite in motion (all in one statement). For people who like to design games, Extended BASIC is a must. The sprites are a lot of fun to work with.

Logo and Logo II are command modules which are popular in introducing children to programming. The TI version of Logo allows all the common turtle commands, and you can define your own characters and choose colors. The Logo II version has music capabilities. To use Logo or Logo II, you need the memory expansion. If you are a teacher using Logo, be sure to get the *Logo Curriculum Guide*. It is a manual of excellent ideas

for using Logo in the classroom. It also includes sample programs.

For machine language, you can get the Editor/Assembler cartridge. The 32K Memory Expansion, Disk Drive, and Disk Controller are required. A less expensive way to try machine language is to use the Mini-Memory module (no peripherals required).

Another language available to TI users is Pascal. Peripherals required are the P-Code Card, 32K Memory Expansion, Disk Drive, Disk Controller, and Peripheral Expansion Box.

I'm sorry I cannot answer your questions about machine language or Pascal. My programming so far has been in BASIC (for several computers) and TI Extended BASIC.

Why Won't The Program Run?

Now to the second main topic - debugging. *Debugging* is a computer term which means finding what's wrong with a program that doesn't work correctly. This month I'd like to give you some tips on how you might pinpoint errors in a program you've typed in but won't run correctly.

Syntax errors are the easiest to find and correct. If you RUN the program, it will stop at any syntax error and tell you exactly what's wrong and in which line. *Syntax* usually refers to a typing error such as a word spelled incorrectly, a comma in the wrong place, unmatched parentheses or quotes, or the wrong number of parameters in a CALL command. The TI catches a lot of typing errors as you are typing in the lines. Others are detected as the program is RUN. Remember that you can type the line number then the down arrow (with FCTN on the TI-99/4A and SHIFT on the TI-99/4) to edit a particular line, then use the arrow keys to move the cursor to the error.

Check line numbers in program transfer statements - GOTO, GOSUB, ON-GOTO, ON-GOSUB, and IF-THEN-ELSE statements. One digit can make a difference in the proper program control. For example, my coordinate geometry program in the February 1983 issue had a typesetting error. Line 760 should have been GOSUB 1860 instead of GOSUB 1850. That one digit caused an error. Several people wrote in very complex solutions to a problem I didn't know existed until I compared line numbers and noticed that one digit. This was one case where there really was a printing error. Now COMPUTE! has the listings printed directly from the computer to avoid such errors.

Check Your DATA Statements

Check to make sure DATA statements are typed correctly. If your program has DATA statements and doesn't run properly, the most likely place for a typing error is in a DATA statement. You

may want to review the description of DATA statements in your *User's Reference Manual* or my August 1983 column on DATA and READ statements so you can follow the logic of the READ statements and corresponding DATA statements.

If you get a DATA ERROR, you may not have enough data items to fulfill the READ requirements. The line number given in the error message is the READ statement, so you'll have to find the corresponding DATA statement. Check the DATA statements for the proper placement of commas. It is possible there are commas together with nothing between them - this indicates a null string or "", and every comma is necessary. Also, make sure you do *not* have a comma at the end of a DATA statement.

Another type of DATA error is that the computer is trying to read a numeric value but gets a string (letters). Again, check the commas. Also make sure you haven't mistyped the number zero and the letter O.

If you have a lot of DATA statements, your eyes may get tired trying to compare printed statements with your typed statements. To try to pinpoint the trouble spot, LIST the lines around the READ statement referred to in the DATA error message. Remember you can list specific lines, such as LIST 640-660. Now PRINT the variables you are reading to find the last good values that were accepted. If you are reading within a FOR-NEXT loop, you can PRINT the index counter to see how far along the loop you are.

Anytime the program stops (BREAK), in this case with an error message, and as long as you don't do any editing, you may PRINT the value of any variable. For example, you may type PRINT B and press ENTER, and the present value of B will be printed. You can then look in the DATA statements to see where that particular value is. The value printed will be the last acceptable value for B, so the next couple of items may contain the error.

An error in a DATA statement may actually cause a problem in a statement other than a READ statement. For example, suppose you have this section of a listing:

```
650 FOR I=1 TO N
660 READ X,Y,G
670 CALL MCHAR(X,Y,G)
680 NEXT I
```

You could get the error message BAD VALUE IN 670. This means X, Y, or G is not acceptable. X must be a number from 1 to 24 for the row number, Y must be from 1 to 32 for the column number, and G must be an ASCII code number. You can PRINT X;Y;G to see what the values for X, Y, and G are. The next step is to see how you got the bad value. In this case, line 660 READs the values from DATA, so you can search through the DATA

statements to find a sequence of the three numbers the computer printed. The error will probably be a typing error just before those numbers.

Other Common Errors

There are also errors unrelated to DATA statements. FOR-NEXT errors are usually not difficult to find. Every FOR statement must have a corresponding NEXT statement. Once in a while, however, you can search and search and everything seems matched up correctly. The most likely cause for the error is that a line just before a FOR statement or just before a NEXT statement has 28 characters (or a multiple of 28), so the cursor goes to the next line. You need to press ENTER, but the cursor makes you think you have already pressed ENTER, and you may go ahead and type the next line. The result is a run-together line. If you list that line among several others, they all look right because the numbers line up properly.

To see if this is the problem, LIST only the line containing the FOR or the NEXT to see if it's really there. Warning: The FOR-NEXT error message may list a line number that is really OK; the run-together FOR or NEXT statement may occur before the one listed in the error message. If you use the automatic numbering feature as you type in programs, this problem is less likely to occur.

The run-together line problem may occur anytime you are typing lines that have 28 characters and could cause other problems.

A "glitch" type problem may occur in ON-GOTO and ON-GOSUB statements. The line should be typed in the following example form:

```
200 ON A GOTO 340,550,760,800
```

where there are no spaces between the line numbers. If you happen to type a space in between line numbers then later LIST the line, the space will not be there but it could still be causing an error. If you suspect you are having trouble with an ON-GOTO or ON-GOSUB statement, retype the whole statement. By the way, don't try to second-guess the author. The line numbers do not have to be in numerical order, and you can use the same line number in several of the positions.

These are answers to the most common questions I've been asked. If you still have questions getting a program to run, you may write to me. Be sure to tell me which program you are typing, which computer you are using, the exact error message with the line number, and what happens plus whatever other conditions may contribute to the problem. I want you to be able to use and enjoy these programs; however, it is difficult for me to help you debug if I don't know the exact conditions and line numbers. Please do not ask me how to solve problems with programs written by other authors.


Also, please do not ask me to debug one of your programs or to write a program (or convert a program) for you. It isn't your project if I do it for you, and the joy of programming is accomplishing your own goals. I also am not set up to review programs for you. You may submit them to COMPUTE! directly. I do welcome comments or suggestions for future columns that will interest the general TI user.

Since I haven't written about a specific programming technique this month, here's a short graphics display program to try this time. I'll try to have a Christmas present for you in my December column.

```
100 DEF R=INT(16*RND+1)
110 RANDOMIZE
120 FOR I=1 TO 16
130 CALL SOUND(-50,R*110,4)
140 CALL COLOR(I,R,R)
150 CALL SCREEN(I)
160 CALL HCHAR(R+4,R*2,R*R/2,R*R)
170 CALL VCHAR(R+4,R*2,R*R/2,R*R)
180 NEXT I
190 GOTO 110
200 END
```

Line 100 defines a function R to be a random integer from 1 to 16. Every time R is used in later lines, R will be a random integer from 1 to 16 - a lot less typing by using the DEFINITION function.


SOFTWARE OUTLET for TI-99/4(A)		
SHUTTLE COMMAND - Exciting 3-D, 1, C, D, XB \$19.95		
HAUNTED LIGHTHOUSE - Grap. Adv. 3, C, D, XB \$17.99		
KONG - 6 all diff. screens. 2, C or D, XB \$15.00		
FROBBY - Action fast & smooth. 2, C or D, XB \$9.95		
Each game gets only \$29.95		
Pak/1 - 5 games, including Froggy & Baseball, 2, C, D, XB		
Pak/3 - Kong, Donozer, Rango, 2, C, D, XB		
SPECIAL	N.W. RUTH CO., Dept. CAS	Dealers
2 items deduct 10%	510 Rhode Island Ave.	Malcoand
VISA, MASTER	Cherry Hill, N.J. 08002	Free cat
Ship & Hdg. +\$2.50	(609) 667-2526	Fast
Cross., B'dist, XB=Extended basic		Delivery
1=Large 2=Extended Software Co. 3=Tooperator		



MEMOREX FLEXIBLE DISCS

WE WILL NOT BE UNDER-SOLD! Call Free (800) 235-4137 for prices and information. Dealer inquiries invited and C.O.D.'s accepted.

PACIFIC EXCHANGES
100 Foothill Blvd.
San Luis Obispo, CA
93401 In Cal call
(800) 552-5935 or
(805) 543-1037



Micros With The Handicapped

Susan Semanick & C. Marshall Curtis

Developing A Communications Program

This is the final column in the series on developing a communications program for the handicapped. The final version of the program, written for the VIC with at least 8K RAM, has the following features:

1. Multiple menu selection, with menus stored within the program.
2. A joystick button used as a one-movement, alternative input device.
3. A faster scanning algorithm used in a passive selection process.
4. Input options:
 - a. Changing the rate of scanning and the time in which to make a selection.
 - b. Changing the menu being displayed.
 - c. Storing messages within the program, which can be retrieved in any order.
 - c. Audible signal when message is ready for viewing.
 - e. Erasing characters, words, or sentences within the current message, or erasing a stored message.
 - f. Saving the program with its menus and messages.
5. Word and character selection from the same menu.
6. Automatic spacing after words and prevention of word-splitting in messages.

User Options

The top line of the screen displays the input options in green. If one is selected, its choices are presented in cyan on the second screen line. The next 13 screen lines are used for menus, which are displayed in blue. Any messages are reverse-fielded in red in the bottom 8 screen lines.

Instead of every menu entry being scanned until the user responds, the columns of the menu

and options are alternately scanned until one is selected. If a menu column is chosen, its rows are scanned until no more selections are made from that column.

A "debouncer" line has been added to the input routine so that the selection timing isn't started until the joystick button is released. This should help avoid unexpected and unwanted multiple selections.

When the message area is filled, the user cannot add to it until after selecting the message erase option. This allows the user to first save the message or signal someone to read it. A saved message is erased by referring to it by a positive number under the ERASE option. Choosing a zero instead will clear the message display area for further message formation.

The message review option allows multiple messages to be displayed in any order. Any current message is preserved, and then restored after the review mode is done.

To make the program easier to use by people with limited computer experience, menus and messages are stored in the program within DATA statements. The program adds new messages to DATA statements by means of the "dynamic keyboard" method. The first DATA statement contains information that the program updates when the user changes response time or the number of stored messages. Then enough DATA line numbers have been reserved for nine messages, each taking up four DATA lines. The remaining DATA lines contain menu parameters and menu entries by rows.

Suggestions

The complete program with all of its features will not fit in an unexpanded VIC. We suggest at least an 8K system to make this a useful communication

tool. If you eliminate multiple menus and some of the input options, and limit the number of messages to be stored even further, you can make the program fit in the unexpanded VIC.

One helpful addition would be the ability to change an entry of a menu or add a new menu. This would allow the user even greater independence in creating a tailored communication tool.

We hope that this series has been helpful to you, or at least given you a new perspective on designing specialized communication programs for the handicapped. There are many other ways to approach the problem, but most of these require a larger and more expensive system than we have considered here. For those wishing to further explore this topic, we recommend the June 1983 issue of *IEEE MICRO* magazine, which contains an excellent article and references on computerized, anticipatory letter-selection programs.

There are also many new computer interface devices being developed for the handicapped user. For instance, an Atari compatible joystick that is mouth operated is being advertised for \$65 by KY Enterprises, 195 Claremont, Suite 288, Long Beach, CA 90803, (213)433-5244.

If anyone knows of other computer programs or devices to help the handicapped, or if anyone develops enhancements to our final program, please let us know and we will share the information with the rest of our readers in this column. You can contact us through Jean Trafford, Secretary, The Delmarva Computer Club, P.O. Box 36, Wallops Island, VA 23337.

VIC Communications Program

```

10 W=22:P=8*W:DIMS(W),L(W),O$(11):SP=409
6:CP=37888-SP:XJ=37137
14 POKE37139,0:SM=SP+W*23-PH:S=36876:P$="
  71"
20 GOSUB950:PRINT"[CLR][GRN]";I$;"[BLU]";
FORI=0TOPM-1:POKESM+I*CP,2:NEXTI
50 GOSUB1010:IFTTHENGOSUB1970:T=0
60 P1=SP:P2=P1+21:A=128:GOSUB1100:GOSUB12
00:A=-128:GOSUB1100
70 IFX=0THEN140
80 P1=SP:P2=SP+LEN(I$)-1:GOSUB1300:IFX=0T
HEN140
85 X1=X:X2=E-2
90 N=Z:PRINT"[HOME][DOWN][CYN]";A$=O$(N)
:IFN=2THENA$=LEFT$(O$(2),2*NM)+"D"
100 PRINTA$:P1=SP+W:P2=P1+LEN(A$)-1:GOSUB
1300
110 IFX=0THENGOSUB1300:GOTO110
120 ONNGOSUB1400,1500,1600,1800,2000
130 GOSUB1150:IFCL=0THENFORI=X1TOX2:POKEI
,PEEK(I)-128:NEXTI
135 CL=0:GOTO60
140 IFTHEN60
145 C=1:PRINT"[BLU]";
146 FORR=1TORM:A=128:GOSUB1090:GOSUB1100:
NEXTR
150 GOSUB1200:FORR=1TORM:A=-128:GOSUB1090
:GOSUB1100:NEXTR
160 IFX=0THEN220

```

```

170 R=1
175 A=128:GOSUB1090:E=P2:FORI=P2TOP1STEP-
1:IFPEEK(I)<32THENE=I:I=P1
180 NEXTI:X=0:P=0
190 P2=E:A=128:GOSUB1100:GOSUB1200
200 P2=E:A=-128:GOSUB1100
210 IFXTHEN230
215 R=R+1:IFR<RMTHEN175
220 C=C+1:IFC<CMTHEN148
225 GOTO60
230 IFC<CM-CC+1THEN300
240 I=P1
245 IFL(C)=1THEN280
250 POKEI,PEEK(I)+128:GOSUB1200
260 POKEI,PEEK(I)-128:IFXTHEN280
270 I=I+1:IFI<=ETHEN250
275 GOTO215
280 POKESM+J,PEEK(I)+128:J=J+1:IFJ=PMTHEN
F=1:GOTO60
290 GOTO148
300 Y=W-(J-W*INT(J/W)+1):IFE=P1>=YTHENGOS
UB360:J=J+Y+1:IFJ>PMTHENF=1:GOTO60
310 I=P1
315 POKESM+J,PEEK(I)+128
320 J=J+1:IFJ=PMTHENF=1:GOTO60
330 I=I+1:IFI<=ETHEN315
340 POKESM+J,160:J=J+1:IFJ=PMTHENF=1:GOTO
60
350 GOTO148
360 FORI=0TOY:POKESM+J+I,160:NEXTI:RETURN
950 READNM,M,DE:IFW=0THEN970
960 FORI=1TOM:READA$,A$,A$,A$:NEXTI
970 READNI,I$:FORI=1TONI:READO$(I):NEXTI:
RETURN
1000 READRM,CM,BR,BC,SC,CC:FORI=1TOCM:REA
DL(I):NEXTI:RETURN
1010 GOSUB1000:S(1)=SC:IFCM=1THEN1020
1015 FORI=2TOCM:S(I)=S(I-1)+L(I-1)+BC:NEX
TI
1020 PRINT"[HOME][2 DOWN][BLU]";:FORR=1TO
RM:READM$:IFLEN(M$)>WHENPRINT"[RVS]
ERROR ROW[OFF]"R:GOTO1040
1030 PRINTM$:IFLEN(M$)<WHENPRINT
1040 IFBRTHENFORB=1TOBR:PRINT:NEXTB
1050 NEXTR:RETURN
1090 P1=SP+2*W+(R-1)*W+(R-1)*BR*W+S(C)-1
:P2=P1+L(C)-1:RETURN
1100 FORI=P1TOP2:POKEI,PEEK(I)+A:NEXTI:RE
TURN
1150 PRINT"[HOME][DOWN]";:FORI=1TO W:PRI
NT" ";:NEXTI:PRINT"[HOME]";:RETURN
1200 X=0:P=0
1205 IF(PEEK(XJ)AND32)=0THEN1205
1210 IF(PEEK(XJ)AND32)=0THENX=1:P=DE
1220 P=P+1:IFP<DETHEN1210
1230 RETURN
1300 Z=0:Y=P1
1305 E=0:FORI=YTOP2:IFPEEK(I)=32THENE=I+1
:I=P2:Z=Z+1:GOTO1320
1310 POKEI,PEEK(I)+128
1320 NEXTI:IFE=0THENE=P2+2:Z=Z+1
1330 GOSUB1200:IFXTHENRETURN
1340 FORI=YTOE-2:POKEI,PEEK(I)-128:NEXTI
1350 IFE<P2THENY=E:GOTO1305
1360 RETURN
1400 ONZGOTO1410,1420:RETURN
1410 DE=DE-.5*DE:GOTO1430
1420 DE=DE+.5*DE
1430 GOSUB1975
1440 RESTORE:READA,A,A:LS=PEEK(63)+256*PE

```

```

EK(64):PRINT"[CLR]{3 DOWN}"LS"DATA";
NM","M","DE
1450 PRINT"CLR:T=1:GOTO10[HOME]":POKE198,
3:F0R1=0T02:POKE631+I,13:NEXTI:END
1500 IFZ>NMTHENRETURN
1510 RESTORE:GOSUB950
1520 FORH=1TOM:IFH=ZTHENH=NM:GOTO1540
1530 GOSUB1000:FORK=1TOM:READA$:NEXTK
1540 NEXTH:GOSUB1975:PRINT"[CLR][GRN]";I$
:F0R1=0T0PM-1:POKESM+I+CP,2:NEXTI
1550 GOSUB1010:GOSUB1970:CL=1:RETURN
1600 ONZGOTO1610,1700:RETURN
1610 IFM=0THENPRINT"[HOME][DOWN][RVS]NO M
ESSAGES STORED.[OFF]{3 SPACES}":GOSU
B1200:RETURN
1620 GOSUB1975
1630 GOSUB1150:A$=LEFT$(O$(2),2*M)+"D":PR
INT"[DOWN]":A$
1640 P1=SP+W:P2=P1+LEN(A$)-1:GOSUB1300
1650 IFX=0THENGOSUB1300:GOTO1650
1660 IFZ>MTHENGOSUB1970:RETURN
1660 RESTORE:READNM,M,DE
1670 FORI=1TOM:IFI=ZTHENI=M:GOTO1680
1675 READA$,A$,A$,A$
1680 NEXTI
1685 K=INT(PM/4+.5):F0R1=1T04:READA$:PRIN
T"[HOME]"A$:FORB=0TOK-1
1690 POKESM+B+(I-1)*K,PEEK(SP+8):NEXTB,I
1690 PRINT"[HOME]":F0R1=1TOW:PRINT":I
NEXTI:PRINT"[HOME][GRN]"I$[CYN]":CL=
1:GOTO1630
1700 POKES+2,15:F0R1=1T050:POKES,220:FORK
=1T05
1710 NEXTK:POKES,0:NEXTI:GOSUB1200:IFX=0T
HEN1700
1720 POKES+2,0:RETURN
1800 ONZGOTO1810,1830,1870,1900:RETURN
1810 IFJ=0THENRETURN
1820 J=J-1:POKESM+J,32:F=0:RETURN
1830 X=0
1835 IFJ=0THENRETURN
1840 J=J-1:IFPEEK(SM+J)<>160THENPOKESM+J,
32:F=0:X=1:GOTO1835
1850 IFXTHENJ=J+1:RETURN
1860 POKESM+J,32:GOTO1835
1870 X=0
1875 IFJ=0THENRETURN
1875 J=J-1
1880 FORI=1T03:K=ASC(MID$(P$,I,1))+128:IF
PEEK(SM+J)=KTHENX=X+1
1885 NEXTI:IFX<2THENPOKESM+J,32:F=0:GOTO1
873
1890 J=J+1:RETURN
1900 GOSUB1150:A$=0 "+LEFT$(O$(2),2*M)+"
D":PRINT"[DOWN]":A$
1905 P1=SP+W:P2=P1+LEN(A$)-1:GOSUB1300
1910 IFX=0THENGOSUB1300:GOTO1910
1915 Z=Z-1:IFZ>MTHENRETURN
1920 IFZTHEN1930
1925 FORI=0T0PM-1:POKESM+I,32:NEXTI:J=0:F
=0:RETURN
1930 RESTORE:READNM,M,DE:LS=PEEK(63)+256*
PEEK(64)
1935 FORI=1TOM:IFI=ZTHENI=M:GOTO1945
1940 READA$,A$,A$,A$
1945 NEXTI:M=M-1:GOSUB1975
1950 PRINT"[CLR]{3 DOWN}":LS:"DATA":NM","
,M",";DE
1955 FORI=1T04:READA$:L=PEEK(63)+256*PEEK
(64):PRINTL:NEXTI
1960 PRINT"CLR:F="F":F":":
1965 PRINT"T=1:GOTO10[HOME]":POKE198,7:PO
RI=0T06:POKE631+I,13:NEXTI:END
1970 FORI=0T0PM-1:POKESM+I,PEEK(828+I):NE
XTI:J=PEEK(828+PM):RETURN
1975 FORI=0T0PM-1:POKE828+I,PEEK(SM+I):PO
KESM+I,32:NEXTI:POKE828+PM,J:RETURN
2000 ONZGOTO2005,2070:RETURN
2005 GOSUB1975
2010 IFM=9THENGOSUB1150:PRINT"[DOWN][RVS]
MAXIMUM=9 MESSAGES.[OFF]":GOSUB1200:
RETURN
2020 RESTORE:READNM,M,DE:LS=PEEK(63)+256*
PEEK(64):L=LS
2025 IFM=0THENL=LS+10:GOTO2045
2030 READA$,A$,A$,A$:L1=PEEK(63)+256*PEEK
(64)
2035 IFL1-L>40THENL=L+10:GOTO2045
2040 L=L1:GOTO2030
2045 M=M+1:PRINT"[CLR]{3 DOWN}":LS:"DATA"
:NM",";M",";DE
2047 K=INT(PM/4+.5):F0R1=1T04
2050 PRINTL"DATA"CHR$(34)CHR$(18):L=PEE
K(209)+256*PEEK(210)+PEEK(211)
2051 FORB=0TOK:PRINT":NEXTB:PRINTCHR$(
34):CR=0:E=0:FORB=0TOK-1
2052 X=PEEK(828+B+(I-1)*K):IF(X<128)ANDCR
=0THENPOKELP+E,210:CR=1:E=E+1
2053 POKELP+E,X+128*(X>127):IFCRTHENB=K-1
2054 E=E+1:NEXTB:IFCR=0THENPOKELP+E,210
2055 L=L+10:NEXTI:GOTO1960
2070 PRINT"[CLR]{3 DOWN}SAVE":CHR$(34)"CO
MMUNICATIONS"CHR$(34)":CLR:GOTO10
[HOME]"
2075 POKE198,1:POKE631,13:END
5000 DATA 3, 0, 100
6000 DATA5,"+- MENU CALL ERASE NEW"
6010 DATA"FASTER SLOWER D"
6020 DATA"1 2 3 4 5 6 7 8 9 D"
6030 DATA"RECALL SIGNAL D"
6040 DATA"CHAR. WORD SNT. MSG. D"
6050 DATA"MSG. PRGM. D"
7000 DATA6,4,1,1,1,3,3,5,7
7010 DATA"DR. IS {2 SPACES}COLD {2 SPACES}I
NGEDS1"
7020 DATA"i {3 SPACES}AM {2 SPACES}WHEN
{3 SPACES}AOTFR3"
7030 DATA"YOU ARE DRINK .ULHCP5"
7040 DATA"MOE EAT WANT {2 SPACES}?MYWKB7"
7050 DATA"DAD NO {2 SPACES}TIME {2 SPACES},
WJQX9"
7060 DATA"HOT YES SLEEP ;$02468"
8000 DATA11,4,0,1,1,1,4,5,9,1
8010 DATA"SUN. EARLY TOMORROW {2 SPACES}0"
8020 DATA"MON. LATE {2 SPACES}YESTERDAY 1"
8030 DATA"TUE. NIGHT WEEKEND {3 SPACES}2"
8040 DATA"WED. WEEK {2 SPACES}SPRING
{4 SPACES}3"
8050 DATA"THU. MONTH SUMMER {4 SPACES}4"
8060 DATA"FRI. YEAR {2 SPACES}WINTER
{4 SPACES}5"
8070 DATA"SAT. DAY {3 SPACES}FALL
{6 SPACES}6"
8080 DATA"A.M. TIME {2 SPACES}MORNING
{3 SPACES}7"
8090 DATA"P.M. NOON {2 SPACES}AFTERNOON 8"
8100 DATA"NOW {2 SPACES}DATE {2 SPACES}EVEN
ING {3 SPACES}9"
8110 DATA"HOUR NEXT {2 SPACES}MIDNIGHT
{2 SPACES}:"
9000 DATA9,3,0,1,2,0,5,7,6
9010 DATA" FISH {2 SPACES}LETTUCE SOUP"

```

9020 DATA" PORK{2 SPACES}CARKOT{2 SPACES}
BREAD"
9030 DATA" LAMB{2 SPACES}CELERY{2 SPACES}
BUTTER"
9040 DATA" HT DG TOMATO{2 SPACES}CHEESE"
9050 DATA" HM BG CORN{4 SPACES}SALAD"
9060 DATA" LIVER POTATO{2 SPACES}DRESSG"
9070 DATA" STEAK FRIES{3 SPACES}CHIPS"
9080 DATA" CHKN{2 SPACES}SPINACH MUFFIN"
9090 DATA" TRKY{2 SPACES}PEAS{4 SPACES}GR
AVY" ©

VIC-20 and Commodore 64

ADVENTURES

BAMBOO CASTLE

An unbelievable adventure that will try your
patience. But intelligence, persistence, and
cleverness pays off. An action packed game that
keeps you on edge.
VIC 10K Req'd
C-64

\$19.95

WAGGLE

Intelligent Intelligence

How a relationship with your computer starts
hard to believe. Discuss it with "Waggle".
VIC 10K Req'd
C-64

\$16.95

WHO DUNIT?

Myra's lover is dead!
How's your analytical mind?
If you have any logic - this is the
game for you.
VIC 10K Req'd
C-64

\$19.95

SCRAMBLESP

We have it! The ultimate challenge in word
scramble. 3 games on one tape.
Test your skill & knowledge.
No cash req. VIC C-64

\$19.95

ORDER ALL 4 FOR 75%
DISC. OR MONEY ORDER
ADD \$1.50 FOR P & H

RAMIAK
A Division of RSI, Inc.
Customer Support

3135 South Nevada Street
Aurora, Colorado 80013
303/890-3088

DEALER INQUIRES INVITED

The Computer Network

Business applications for the Commodore 64 and VIC 20

The Computer Network has 80 column screen adaptors, wordprocessing software, accounting software, spreadsheets, printers, modems, monitors, interfaces, furniture, disks, disk drives, cassettes

The Computer Network carries Commodore, DATA 20, Star Micronics, Brother, Epson, IDS, Okidata, Silver Reed, BMC, Amdek, Zenith, Micro World, MSD, Kero, HES, ES, Infodesigns, Timeworks, J & G Software, TOTL Software, Pacific Coast Software, and Professional Software.

The Computer Network will work with you from choosing the proper equipment, installation, repair, and best of all someone to talk to when it doesn't work! Looking for a product and still can't find what you want? If we don't have it we can get it. The Computer Network is not a discount mailorder house. The Computer Network is a full service retail organization.

The Computer Network

P.O. Box 9840
Fountain Valley, CA 92708
Call Toll Free 800-221-9948
in California 714-855-4366

If you want your 64 to do more than play games.
The Computer Network has what you want!

SCRIPT 64™

THE WORDPROCESSOR THAT TURNS YOUR COMMODORE 64™ INTO A BUSINESS MACHINE!

- Flexible . . . Now, 80-columns without any additional hardware!
- Powerful . . . Supports all Commodore disk drives and IEEE printers thru optional C64-LINK interface.
- Versatile . . . Provides full-function text editing plus a built-in dictionary!

All this for only \$99.95!

Contact Your Nearest Commodore Dealer Today . . .

You'll Be So Glad You Did!

Distributed By:

**COMPUTER
MARKETING SERVICES INC.**

300 W. Marlton Pike
Cherry Hill, New Jersey 08002
(609) 795-9480

Commodore 64 is a trademark of Commodore Electronics Limited

Script 64 is a trademark of Rhyolite Telecommunications

The STATUS Variable

Part 2

In this conclusion of the two-part article on the STATUS variable, we examine possible ST bit values and the resulting indicators.

Before we continue our investigation of the STATUS variable (ST), let's briefly review what we discussed in Part 1.

ST is a reserved variable (which means that, like TI for TIME, we can't use ST as a variable in our programs) whose value indicates if anything unusual happened during the last I/O (Input/Output) operation. This status value signals a number of different conditions, using a separate bit "on" for each. However, last month we avoided a direct discussion of bits. Instead, we decided to dissect the ST value by representing the value as a sum of the numbers in the group 1, 2, 4, 8, 16, 32, 64, and -128. If you allow each number to be used only once, only one combination of these numbers can represent the value returned by ST. For example, -118 can be represented by the sum $-128 + 8 + 2$.

Last month we began investigating what the ST variable tells us with respect to the Datasette unit, specifically by examining the End-Of-File (EOF) indicator. The EOF condition is indicated by the presence of 64 in the sum equivalent to the ST value. After a sequence of simple test programs, we discovered that the End-Of-File indicator really meant that the next byte in the file has a value of 0. If perhaps some 0 bytes got mixed into your data, the EOF indicator would sometimes be on when reading the data.

We also found that data is written to the cassette in blocks of 191 bytes, and that a 0 byte is added automatically to the end of the data when the file is closed. Chances are very good, however, that the last block written to the file will contain something less than 191 bytes. One of the tests

performed last month showed that if you accidentally read past the end of the data, you could continue receiving data with no apparent ill effects, except that the data isn't valid. We even found that you could continue reading right into an End-Of-Tape block which could follow the data file.

Testing With INPUT#

It is obviously essential, then, to pay attention to the EOF indicator and not allow any 0 bytes to be written to the data file. All the tests in last month's column used the GET# statement to read the data. Before leaving our discussion of the EOF indicator, we should see if there are any problems when using the INPUT# statement. Essentially, we need to find out how the INPUT# statement reacts to the presence of 0 bytes, and what EOF conditions they cause. Run this simple program:

```
100 OPEN 1,1,2,"TEST"
110 PRINT#1,"A";CHR$(0); "B"
120 PRINT#1,"C";CLOSE 1
200 PRINT "REWIND THE CASSETTE."
210 PRINT "PRESS RETURN WHEN READY."
220 INPUT Z$
300 OPEN 1,1,0,"TEST"
310 INPUT#1,Z$:PRINT Z$,LEN(Z$),ST
320 INPUT#1,Z$:PRINT Z$,LEN(Z$),ST
330 CLOSE 1
```

As you can see, lines 100-110 write two lines to a file, lines 200-220 ask you to rewind the cassette, and lines 300-330 read the file. Running this program results in the following display:

A	1	64
C	1	64

Something a little strange happened. The second string read began with the letter C, which implies that the B was previously read as part of the first string - yet it does not appear as part of

the first string. Also, an EOF indicator was given with the first string even though the 0 byte occurred in the middle of the string.

The missing B is fairly easy to explain. The INPUT# statement first reads its data into an input buffer. When the statement stores the data into a string variable, the data must be moved to another area of memory where string characters are stored. In this process, a 0 byte is used to mark the end of the string data to be moved. The presence of the 0 byte in the middle of the data being moved causes the process to be terminated prematurely. Thus the B is left in the input buffer, but isn't stored as part of the string.

As for the EOF, once it is set, it will remain set even though additional bytes are read as part of the input. This also illustrates another case where the EOF indicator does not halt the input of data. This means you must make sure the last data written is properly terminated if you intend to read that data with an INPUT# statement. In our program above, the PRINT# statement causes a carriage return to be written after the C. With this carriage return as the terminator, we get a valid EOF condition when reading the last of the data.

Block Length Errors

A SHORT BLOCK is indicated by the presence of the number 4 in the sum equivalent to the ST value. A LONG BLOCK is indicated by the presence of the number 8 in the sum. These status indicators mean that a block has been read from cassette which contains something other than the expected 191 bytes. This naturally indicates an error: the data read from this block is probably not what we want. These errors occur if something goes wrong while LOADING the cassette, or if something went wrong while SAVING to the cassette.

Another way to receive these error indicators is to read a program file as if it were a data file. A program file, written by the SAVE command, differs from a data file in that the program is written as a single block. Actually two copies of the program are written (that is, two blocks), with the second copy being used to check for errors in the first block. It is highly unlikely that a program would contain exactly 191 bytes, so you will probably get an error if you try to read a program file as data. For example:

```
100 SAVE "TEST"
200 PRINT "REWIND THE CASSETTE."
210 PRINT "PRESS RETURN WHEN READY."
220 INPUT Z$
300 OPEN 1,1,0,"TEST"
310 GET#1,Z$:PRINT LEN(Z$),ST
320 CLOSE 1
```

The result displayed is:

1 4

The 4 printed for ST shows that our test program is less than 191 bytes long. You might also note that Z\$ still received a byte of data although there was an error when the block was read from the cassette. We can try to force a LONG BLOCK error by adding the following two lines to the example above:

```
110 REM MAKE THE PROGRAM LONGER
120 REM MAKE THE PROGRAM LONGER
```

These lines make the program slightly longer than 191 bytes. Running the program now displays:

1 32

This wasn't quite what we were expecting. The 32 for ST indicates a CHECKSUM ERROR. With each 191-byte block written, a sum of all the bytes in the block is written along with the data. This sum, called the CHECKSUM, is used to help make sure the data is later read correctly. If at least 191 bytes are received for the block, the CHECKSUM is checked first. Even if the CHECKSUM accidentally matched, we would still get a LONG BLOCK error.

End-Of-Tape Condition

EOT is indicated by a -128 in the sum equivalent to the ST value. The program below provides a simple demonstration:

```
100 OPEN 1,1,2,"TEST"
110 PRINT#1,"A":CLOSE 1
200 PRINT "REWIND THE CASSETTE."
210 PRINT "PRESS RETURN WHEN READY."
220 INPUT Z$
300 OPEN 1,1,0,"NOFILE"
310 PRINT ST:CLOSE 1
```

However, when we RUN this program, the result isn't at all what we expected. We never get a chance to look for a value of -128 in the ST variable because the program quits with the message ?DEVICE NOT PRESENT ERROR IN 300. Later in this article we'll see that when using the serial bus, a -128 for ST indicates that an attempt was made to send data to a device not connected to the computer. When BASIC detects a -128 in the ST value while a file is open for reading, it aborts the program with the "device not present" message without checking to see if the device was the Datasette (in which case the -128 was due to an EOT marker being detected) or a serial bus peripheral such as a disk drive or modem (in which case the -128 indicates a true "device not present" condition). Since the error message throws us out of our program, there's no way to check for the EOT indicator while reading a cassette file in

WORD PROCESSOR FOR COMMODORE 64™

EXPAND YOUR HORIZONS



80 CHARACTER DISPLAY USING ONLY SOFTWARE!

Mirage Concepts' Word Processor does not require costly add-on modules to deliver an 80 column display from your standard Commodore 64™. 200 pages of helpful documentation includes Tutorial, Reference and Index sections. Mirage's Word processor is all you need to expand your Commodore 64™ into an easy-to-use and powerful problem solver with the capabilities of far costlier systems.



Mirage Concepts' Word Processor is only

\$99⁹⁵

Available At Quality Computer & Software Dealers Nationwide

MIRAGE CONCEPTS, INC.

2519 W. Shaw Ave., #106 • Fresno, CA 93711 • (209) 227-8369

TELEPHONE ORDERS: (800) 641-1441 • In California (800) 641-1442

MIRAGE'S WORD PROCESSOR FEATURES:

- 40 or 80 Column screen Display
- 100% Machine Language
- Over 70 Single Keystroke Commands
- Printed Page / Line / Character Counters
- True Word Wrap
- Search, Replace and Block Operations
- 200 Pages of Documentation in Hard Vinyl Binder

Ask About Mirage Concepts'

COMPATIBLE DATABASE MANAGER

Discover How Easy Information Management Can Be!

COMPUTER MAIL ORDER

TeleVideo



TERMINALS

910	\$258.00
912	\$463.00
920	\$379.00
925	\$719.00
950	\$529.00
970	CALL

COMPUTERS

005A	\$1099.00
003	\$2799.00
003	\$1949.00
002H	\$4995.00
008-20	\$4999.00
016-40	\$1919.00
1802	\$3395.00
1803	CALL

MODEMS

Smart	\$719.00
Smart-1600-2400	\$849.00
Chronograph	\$113.00
Microsoftware 100	\$339.00
Micromodem II	\$279.00
Microterminal II (with term)	\$399.00
Smart Card II	\$59.00
Smart 1200B	\$499.00

NOVATION

4-Cat	\$119.00
Cat	\$114.00
U-Cat	\$159.00
103 Smart Cat	\$499.00
Apple Cat II	\$279.00
103/212 Smart Cat	\$439.00
212 Apple Cat II	\$509.00
Apple Cat II 212 Upgrade	\$309.00

ANCHOR

Mark I (RS 232)	\$79.00
Mark II (Serial)	\$79.00
Mark III (T 1.59)	\$109.00
Mark IV (IBM PET)	\$129.00
Mark V (Orbital)	\$89.00
Mark VI (IBM PC)	\$179.00
Mark VII (Auto Answer)	\$119.00
Mark VIII	\$269.00
Tri-25 Color Computer	\$199.00
9 Volt Power Supply	\$9.00

ZENITH

Z71 Terminal	\$369.00
--------------	----------



HEWLETT PACKARD

HP 41CV...	\$209.00
HP 78...	\$749.00
HP 61C	\$149.00
HP 10C	\$52.00
HP 11C	\$69.00
HP 12C	\$92.00
HP 15C	\$92.00
HP 18C	\$92.00

For HP61/10C/15C

HP41 Module	\$99.00
HP 11C Cassette or Printer	\$359.00
Cord Reader	\$144.00
Extended Function Module	\$64.00
Time Module	\$64.00

EAGLE



IEE-1	\$1269.00
IEE-2	\$1649.00
IEE-3	\$2399.00
IEE-4	\$3199.00
PC-1	\$1379.00
PC-2	\$2399.00
PC-3	\$2799.00
PC-4	\$3599.00
1620	\$3599.00
1630	\$5499.00
1640	\$6499.00
Cyma Software	CALL

MONITORS

300G	\$149.00
300A	\$159.00
310A	\$169.00
Color I	\$279.00
Color I plus	\$299.00
Color II	\$339.00
Color III	\$349.00
Color IV	\$399.00

USI

9-1 9" G	\$99.00
9-2 12" G	\$119.00
9-3 12" A	\$159.00
9-4 9" A	\$139.00
1400 Color	\$299.00

ZENITH

ZVM 123A	\$119.00
ZVM 123G	\$109.00

BMC

12 Green	\$85.00
8181 13 Color	\$299.00

TAXAN

12 N Green	\$129.00
12 A Amber	\$139.00

PANASONIC

TS 120 10 in Green	\$149.00
CT 160 Dual Mode Color	\$279.00

NEC

JE 1200	\$119.00
JE 1201	\$149.00
JC 1212	\$299.00
JC 1232	\$299.00
JC 1203	\$499.00

GORILLA

12" Green	\$89.00
-----------	---------

EPSON COMPUTERS

QE 10	CALL
ME 20	CALL



TI-40

COMPACT

COMPUTER

\$209

TIMEX SINCLAIR 1000	\$49.95
------------------------	---------

16K Memory	\$44.95
2040 Printer	\$99.95
Vu Card	\$17.95
Microcass Printer	\$99.95

IBM



NEC 3850 PRINTER - 31786 PERCENTAGON DRIVE

3W 322K Floppy	\$279.00
3meg hard w/controller	\$1495.00
10 meg hard w/controller	\$1795.00
15 meg hard w/controller	\$2185.00
20 meg hard w/controller	\$2595.00
AMDEK	
310A Amber Monitor	\$159.00
DET 100 Plotter	\$199.00
Color II	\$299.00

AST RESEARCH, INC

SEAPARUS 56K	
clock, serial, parallel	\$209.00
clock, serial, parallel, graphics	\$339.00
SEAPARUS 56K	
clock, serial, parallel	\$339.00
clock, serial, parallel, graphics	\$379.00
clock, serial, parallel, graphics	\$419.00
COMBOPUS 56K	
clock, serial, parallel	\$309.00
100PLUSII	
clock, serial, parallel	\$145.00
clock, serial, parallel, graphics	\$179.00

PROFESSIONAL SOFTWARE

PC Plus Word Processing	\$319.00
-------------------------	----------

MICRO PRG

Word Start Mail Merge	\$319.00
InfoStar	\$299.00
SpellStar	\$159.00
CalStar	\$159.00

MICROSTUF

Crosstalk	\$139.00
-----------	----------

MICROPROF

Multiplan	\$199.00
-----------	----------

ASHBTON-TATE

D-Base II	\$149.00
-----------	----------

IUR

EasyWriter II	\$209.00
EasyWriter	\$129.00
EasyWriter	\$129.00

EDUCATIONAL SOFTWARE

1st Class Mail/Form Letter	\$69.00
The Home Accountant Plus	\$109.00

SYNAPSE

File Manager	\$119.00
--------------	----------

LOTUS

123	\$399.00
-----	----------

PARLE

File	\$69.00
Report	\$69.00
Graph	\$99.00
Write	n/a

KRAFT

IBM JoyStick	\$55.00
IBM Modules	\$39.00

QUAD RAM

CALL	
------	--



PC-1500A \$169.00

Pocket Computer

PC-1250A \$89.00

125 Printer/Modem/Cassette	\$129.00
150 Printer/Printer/Cassette	\$172.00
151 Printer/Printer/Recorder	\$172.00
155 K RAM	\$34.00
156 K RAM Battery	\$129.00
161 16K RAM	\$139.00

SANYO



MFC-555C	\$719.00
MFC 1100	\$1599.00
MFC 1150	\$2099.00
MFC 1200	\$1199.00
MFC 1250	\$1399.00
FDD 3200 320K Drive	\$299.00
FDD 5400 54K Drive	\$499.00
F 5505 Printer	\$999.00

PRINTERS

EPSON

Matrix FT M-1000 F550	
F500 F5100	CALL

OKIDATA

82 83 84 92 93	CALL
----------------	------

STAR

STX 80	\$169.00
Game 10K	\$299.00
Game 15K	\$419.00
Serial Board	\$75.00

SMITH CORONA

TP 1	\$499.00
TP 2	CALL
Tractor Feed	\$119.00

CITOH

Gentle	\$209.00
Powerstar 1550P	\$89.00
Starwriter P10-40P	\$114.00
Powerstar P10-50P	\$159.00
Tractor Feed	\$199.00

DAISYWRITER

2000 Letter Quality	\$114.00
2000 NEW	CALL
Tractor Feed	\$109.00

DIASLO

400	\$999.00
630	\$1799.00

IDB

Call for All Configurations on	
IDB PRISM PRINTERS	

NEC

6023	\$399.00
3025	\$729.00
3025	\$1599.00
3030	\$1499.00
3030	\$1799.00
7750/7730	\$1999.00

BMC

401 Letter Quality	\$499.00
--------------------	----------

BROTHER

Connector II Printer	\$999.00
----------------------	----------

CABLE & CONNECTIONS

Atari to Parallel	\$29.00
Atari to Serial	\$29.00
Apple to Parallel	\$69.00
Apple to Parallel/Graphics	\$99.00
Apple to Serial	\$69.00
IBM to Parallel	\$75.00
IBM to Serial	\$29.00
Parallel to Parallel	\$29.00
Serial to Serial	\$29.00
Graphics Plus	\$129.00
PS/2	\$139.00
Atari to Modern Cable	\$29.00
IBM 64 to IEEE Board	\$79.00
Apple 80 Columns Card	\$59.00
IBM 80 Columns Card	\$79.00
IBM 80 Columns Card	\$129.00

PAPER SUPPLIES

100# Address Labels/Tractor Feed	\$9.95
15# Report Paper/Tractor Feed	\$24.95
8 1/2" Thick White Paper/Tractor Feed	\$19.95

WEST

1-800-648-3311

In NV call (702)588-5654 Order Status Number: 588-5654

Dept. 1106, P.O. Box 6689, Stateline NV 89449

No risk, no deposit on C.O. orders. Pre-paid orders receive free shipping within the U.S. (continental United States) with no waiting period for certified checks or money orders. Add \$3.00 shipping and handling fee for C.O. and credit card orders. (Larger shipments may require additional charges, for and PA residents add sales tax. All items subject to availability and price change. We stock manufacturers' and third party software for most all computers on the market. Call today for our catalog.

BASIC. We'll just have to be careful not to attempt to read past the last file on the tape.

While BASIC won't let us check for the EOT marker, it doesn't place the same restrictions on itself. BASIC checks the ST variable for a -128 while LOADING or VERIFYING from cassette to determine if it has read the last program from a tape.

There's one remaining possible condition for the ST variable in cassette operations. A value of 16 in the sum indicates an UNRECOVERABLE READ ERROR. This means that a byte could not be read from the tape. However, as with the LONG BLOCK error, it is unlikely that you will detect this condition since the bad byte will also cause a CHECKSUM error, which is what the ST variable will report. As with the EOT indicator, this is a value which BASIC uses for its own testing during LOADs and VERIFYs.

We said earlier that when you SAVE a program to tape, two copies of the program are actually written out. When the program is read back in, BASIC checks for a value of 16 in the ST variable as the first copy is being read. If too many bad bytes are found, BASIC uses the second copy of the program. It is this feature which makes Commodore Datassettes such reliable data storage devices. People who have used tape storage for other home computers may have trouble believing how rarely the ?LOAD ERROR message is seen on the 64.

In our discussion of the ST variable as it relates to the cassette unit, we found several cases where its actual operation wasn't quite what we were told in the documentation (which didn't say very much on the ST variable anyway). This information will prove useful should you try to write your own program using the cassette for data storage. Also, when information provided by books or manuals isn't sufficient to deal with your specific questions or difficulties, using small test programs is often the best way to find out how something really works.

The Serial Bus

The serial bus is involved when connecting various devices, such as the 1541 disk drive, to the 64. Let's take a look at what the ST variable tells us when used with the serial bus. According to the *Commodore 64 Programmer's Reference Guide*, the status indicators are as follows:

VALUE	MEANING
1	READ TIME OUT
2	WRITE TIME OUT
4	not defined
8	not defined
16	not defined
32	not defined
64	EOI
-128	DEVICE NOT PRESENT

We'll begin with the EOI indicator, which, like EOF for the cassette, indicates when the end of the data has been reached when reading. Again, the important question is whether the EOI indicator accompanies the last byte of data, or comes on when you try to read past the last byte. A simple test program would show that the EOI indicator accompanies the last byte of data, like the EOF does with the cassette. However, a little more investigation shows that the 1541 disk drive, unlike the Datasette, is able to really know when the last byte is sent. This means your data can have all the 0 bytes you want without causing multiple EOI indications.

This also implies that the disk does something different from the cassette with respect to reading past the end of the data. A simple test here shows that the EOI indicator remains on as you continue to read past the end of the data. In addition, the READ TIME OUT indicator comes on (that is, the ST value is 66, the sum of 64 + 2). Thus, for any given read operation, a read routine is able to determine if the operation occurred normally, read the last byte, or has already passed the end of the data. This is a substantial improvement over what the ST variable tells us when we're working with the tape unit.

The DEVICE NOT PRESENT indicator

The DEVICE NOT PRESENT condition is shown by the presence of -128 in the sum equivalent to the ST value. This indicator shows that an attempted communication with a particular device was not successful. The error is obvious if the selected device is not connected or not turned on. In addition, if you try to write to an existing file or read a nonexistent file on the 1541, you will get this error message.

It is important to remember that this condition can't occur until an attempt is made to transfer data. A statement like OPEN 1,13 doesn't transfer any data, so the status bit doesn't get a chance to get set. Should you execute such a statement in a program and later execute a PRINT#1 statement, the ST variable would return a value of -128, as you would expect. If you execute a GET#1 or INPUT#1 instead and have no devices connected to the serial bus, you will also get -128 for ST.

However, if at least one device is connected, then the 64 will hang up if you do an INPUT# or GET# from the nonexistent device. The only way to recover is to press the STOP and RESTORE keys simultaneously. The 64 can tell when the desired device isn't there to receive data, but not when the device isn't there to send data. The 64 will patiently wait forever if you let it. This doesn't happen, however, when no serial devices are connected or turned on. The 64 must always out-

American Peripherals

Commodore 64 is a registered trademark of Commodore LTD.

Commodore-64 Users You're Not Alone Anymore

Now you can get a full range of support services from our International Commodore-64 Users Group, including a free newsletter, special sale prices on software and hardware, and inexpensive rentals of all Commodore-64 cartridge-based programs. Look at these sample prices.

	List	Sale	Rental (1 Month)
COMMODORE			
Music Composer	15.95	12.76	3.00
Music Machine	15.95	12.76	3.00
Clowns	15.95	12.76	3.00
Jupiter Lander	12.95	10.36	3.00
Kickman	15.95	12.76	3.00
Omega Race	15.95	12.76	3.00
Sea Wolf	15.95	12.76	3.00
Speed/Bingo Math	15.95	12.76	3.00
Visible Solar System	18.95	15.16	3.00
Radar Rat Race	12.95	10.36	3.00
HES			
HES Mon-64	39.95	31.96	4.00
HES Writer-64	44.95	35.96	4.50
Gridrunner	39.95	31.96	4.00
Retroball	39.95	31.96	4.00
Turtle Graphics II	49.95	39.96	5.00
QUICK BROWN BOX			
Word Processor	65.00	52.00	6.50
OCEANS INTERNATIONAL			
Amazing Maze	32.95	26.34	3.50
Close Encounters	32.95	26.34	3.50
Dot Gobbler	32.95	26.34	3.50
Space Ric-O-Sha	32.95	26.34	3.50
Tank Wars	32.95	26.34	3.50
CREATIVE			
Moondust	34.95	27.96	3.50
Save New York	34.95	27.96	3.50
Astroblitz	34.95	27.96	3.50
Trashman	34.95	27.96	3.50

Membership fee only \$15 to join, plus \$10 per year dues (total of \$25 first year). Call or write for more detailed information.

And don't forget our own OMNIWARE programs on tape or disk (also available for VIC-20).

OMNIFILE Data Manager	\$19.95
DRILLMASTER Quiz and Drill Program	\$15.95
OMNITEST (Both of the above)	\$27.95
OMNICOMM Smart Terminal Program	\$39.95



1948 OAK RIDGE TURNPIKE OAK RIDGE, TN 37830

615-482-9592

VISA AND MASTERCARD ACCEPTED

put some command bytes to identify the device with which it wants to communicate. With no devices to receive the command bytes, the DEVICE NOT PRESENT condition is detected before the computer begins waiting to receive data from the nonexistent device.

Since writing to a nonexistent device either hangs up the 64 or gives a DEVICE NOT PRESENT error, it leaves me wondering what situations cause the WRITE TIME OUT. We have already seen the READ TIME OUT, but that was in conjunction with the EOI indicator. Again, there isn't much in the user's manual or reference guide on this topic. I assume that these manuals indicate a data transfer operation was unsuccessful or failed to occur within some time limit.

What we've seen here for status indicators on the 64 may not be typical for other computers. You will find that the EOF indicators will typically come on after the last byte is read, rather than in conjunction with the last byte. So if you are using another computer in addition to the 64, be prepared to find some differences with respect to status indicators for I/O operations.

This Publication is available in Microform.



University Microfilms International

Please send additional information

for _____ (name of publication)
 Name _____
 Institution _____
 Street _____
 City _____
 State _____ Zip _____

300 North Zeeb Road, Dept. P.W., Ann Arbor, MI 48106

Strengthen your hand *with Superbase* 64

The complete information control system for the Commodore 64. Ideal for any home, business or professional environment where records are kept. Create the format you

need and enter your records. If the layout or data field sizes are not quite right, correct them and carry on. Superbase gives you an unrivalled range of powerful features including:

FLEXIBLE RECORDS

- Fully definable records with text, numeric, calculated result, date, constant, linking and key fields
- Record size up to 1000 characters
- Up to 4 screens per record
- File size up to 16 million characters

QUICK ACCESS

- Search, select from and sort names, dates, values
- Fast key access
- Search and select using multiple criteria
- Print, display or store selections
- Fully definable report and screen formats
- Browse feature

EASY AMENDMENTS

- Add or remove fields dynamically or alter their length with no need to rebuild files
- Completely redefinable records
- Full file update and delete facility
- Fast on screen recalculation of numeric fields gives genuine spreadsheet capability
- Calendar arithmetic

LINKS TO WORD PROCESSING

- Links to Easy Script word processor and Easy Spell for malapropisms, letters, quotes, tables etc with 100% spelling accuracy
- Calculator and explanatory HELP screens
- Off the Shelf applications to suit your special needs - records, stock subscriptions, hotel and catering etc

Find out more about Superbase 64. Contact your local Commodore Dealer or Precision Software at our U.K. office.

Precision Software Limited
Park House 4 Park Terrace
Worcester Park
Surrey KT4 7JZ England
Telephone: 01-330 7166
Telex: 8955021 PRECIS G


Precision
Software



Automatic Variables For Atari PILOT

Marvin Roberts

Self-definition allows a variable to be mentioned once, and only once, in a PILOT program. By using a few techniques not discussed in the documentation, it is possible to write a PILOT "story compiler" which: scans a simple text program; asks for values for \$VARIABLES; stores these values; and runs the simple text program using the defined values.

The computer can help you create a game using substitution stories. PILOT is a good language for this type of interaction, especially for stories which younger children create themselves.

While preparing this type of material, you quickly recognize two things: similar words are repeated in story after story, and each variable occurs twice, once in a question and once again in the story.

To cut down on the typing and to allow a more elaborate response to the more common words and phrases, some sort of general programming technique is required. Program 1 is a short example which illustrates the technique.

Program 1:

Example Of PILOT Self-defining Variables

```
10 T: (CLEAR)
20 T:===== example #1 ===
30 A:$A=MARY had a $LITTLE LAMB
40 R:later READ D:$FILENAME,$F
50 MS:$,
60 R:split at $
70 T:
80 DUMP
90 A:=$RIGHT
100 MS: (RIGHT) ,
110 R:skip pad (RIGHT) split at blank
120 DUMP
130 T:===== $LEFT > \
140 A:$A
150 C:=$LEFT=$A
160 R:self-defined variable
170 T:
```

```
180 DUMP
190 T:MARY had a $LITTLE LAMB
200 T:=== end of example #1 ===\
```

The Match String command allows you to split strings into sections. There are several subtle points which need to be noted.

First, strings in the Accept buffer are padded with a leading and a trailing blank, internal blanks are collapsed to only one character, and any lowercase characters are switched to uppercase. You will never get a match on a lowercase string even though it is not rejected by the Match and Match String statements. \$VARIABLE names are also restricted to uppercase alphanumeric, but the Accept and Calculate commands generate a warning message, as should the Match statements.

Second, trailing blanks are important. Although the documentation states that an underscore character (_) is used to match on trailing blanks, the actual behavior is more direct. You simply include a blank before the comma (,) or vertical bar (|) which terminates the Match String. This feature works very nicely.

A consequence of the active trailing blanks, however, is that you must use the trailing comma if you have a comment field on the same line as a Match, or if you want to select on a trailing blank. A more subtle consequence of the same logic is that you must avoid comments on an Accept: \$VARIABLE line, as the extra blanks would be appended to your entry.

Third, if you use a cursor right (RIGHT) string entry, the leading character positions may be ignored on the match. A similar technique, concatenating an escape (ESC) character and then Matching with a right cursor escape (RIGHT) (ESC), would allow you to trim both the leading and trailing blanks. Take a close look at Program 1 and try various other combinations.

The final technique in Program 1 is the use of

November 1983 CONNETH 247

THE PROGRAM STORE

Arcade Isle

THE JOYBOARD

from Amiga
Why sit when you can play? Your whole body plays! Step onto the joystick and enter the game. Your entire body is at the controls—you lean and tilt in possible directions to fly, glide, dive and zoom through the universe of computer games. Heavy duty for rugged play, it holds up to 250 lbs and the special base allows use on virtually all surfaces. The ten foot cord plugs in like joystick. You plug your joystick into the JOYBOARD/PC Connect with an exciting action game on ROM cartridge for Atari 400/800.

#35266 JOYBOARD for Atari 400/800 \$49.95

POWERSTICK

Precision joystick by Amiga

Amazing new technology means—extra speed, more control, smaller, more playable size, and no hand fatigue! Fine button on both sides for left, right or two handed use. Lightweight but sturdy—perfect for use with the joystick. You move at the action you get from the 3 inch size!

#28910 POWERSTICK for Atari 400/800 \$10.95

Q*BERT

Official Arcade Version by Parker

All the action and excitement of the popular arcade game as Q*BERT hops up and down the cubes of the pyramid, changing colors as he lands. Color all the cubes and he moves to a new—and more difficult pyramid. But cagey creatures want to stop him from his lonesome mission so the one or two players will have some hot hopping to do!

43423 Atari ROM \$48.95

also for Vic-20

POOYAN

Official Arcade Version by Dataeast

Enjoy arcade play without all the quarters! Quick reflexes and fast thinking will protect your helpless partner! The fiercest battle is fought against the wolves and redies arrows, hot air balloons, fire cars, acorns, strawberries and more! Live your action, make your graphics and strategy equipment—don't give up because the wolves won't!

27807 Atari 32K Tape/Disk Double Pack \$29.95 on sale 20% off til Nov. 30 \$23.96

OPERATION WHIRLWIND

by Roger Dornon from Broderbund

A war game that is sure to take you by surprise! The 4 levels of play at the World War II strategy game might last from 3 hours. Viewing the European battle from the air, you'll use your joystick to direct the on-screen action. Move your forces about, and to take specific action. (Bonus: a 4-level map of Europe, a 4-level map of Europe.)

33325 Atari Disk \$34.95

YOUR COMPUTER JUST GOT A WHOLE LOT SMARTER...

Let's face it, your home computer is only as smart as the software you use. Where do you find enough programs to make it more intelligent? At The Program Store! Nowhere else can you find more programs—to communicate, to educate and entertain. This is just a sampling—call or come into one of our stores to find out how to make your computer smarter!

Datsoft Inc.

WORD WIZARD

from Dataeast

More word processing POWER—in the enhanced version than ever before! Consists of a powerful editor, formatter and disk manager. Word Wizard makes text writing quick and easy. Lists, menus, prompt lines and control codes sent directly to the printer.

#31970 16K Atari ROM \$69.95

PLANETFALL

by Steven Merestay from Infocom

Watch out for falling planets! Use the 600 word vocabulary of this science fiction adventure to solve riddles and save the uninvited aliens stricken by plague. You and your robot Floyd have up to 10 days to stop the planet from plummeting into the sun. Realistic interaction allows players to eat, sleep, get sick and even dream as you complete against time!

#23072 Atari Disk \$49.95

Also for Apple, IBM and C64

Zork I #26547 Disk \$39.95

Zork II #26548 Disk \$39.95

Suspended #21888 Disk \$45.95

Shantara #40712 Disk \$39.95

Winners #31291 Disk \$46.95

Deadline #26509 Disk \$45.95

ULTIMA II

from Sierra On-Line

Lord British has done it again! Revenge of the Enchantress in this fantasy role playing game of graphic adventure. Ultima II continues the saga of good against evil and gives you the chance to change the future. New maps with each village—spectacular screen view of your progress. Your goal is to destroy Mordred—but she's somewhere in time and you must find her. A map of the realm and the responsibility that goes with it is now yours!

#29810 Atari Disk \$49.95 also for Apple and IBM

Also, ULTIMA, the best-selling fantasy role playing game!

#29900 Atari Disk \$38.95 also for Apple and IBM

\$31.96 On Sale 20% off til Nov. 30

Family Play

You can play (and learn) with other family members or friends with any of these programs. Or you can practice against the computer. All are excellent gifts for the family get-togethers this holiday season!

ARCHON

by Free Fall from Electronic Arts

Abracadabra! In this original strategy game you move your mythical players, live wizards, on an ever-changing board. Things are said until you catch an opponent's piece. Then you move instantly to a battlefield where the powers of your piece (like an archer) and your skill light the appointment (as in g. Giffins). It's a hit in our office!

#30407 Atari 48K

Disk \$39.95

M.U.L.E.

by Graft-Strategic from Electronic Arts

A strategy trading game in which four players attempt to settle a dust-filled planet with the help of a machine they learn to hate. Multiple Use Labor Element! If you don't have four, the program will gladly take the other positions. There are three game variations and handicaps available. Though it may be hard to imagine, this simulation is played entirely with joysticks, no keys. It's so popular around here that we have had many after-work games!

#20833 Atari 48K Disk

\$39.95

CREATURE CREATOR

from Designman

Our previous ad for this product, emphasized the educational nature but we should have mentioned that it is most often used as a family game. First, you create one of thousands of creatures using heads, arms, bodies and legs. Then you animate the creatures with simple steps of just pressing on keys. Pattern recognition and the concept of computer programming are just a by-product of hours of fun for the entire family.

Atari 48K Disk \$39.95

also available for Apple

\$31.96 on sale 20% off til Nov. 30

MATCH-BOXES

by Al Cheever from Broderbund

An animated game for the family! Lurking behind a grid of 36 numbered boxes is an animated menagerie of colorful characters, creatures and objects, each with a catchphrase all its own. Uncover boxes one at a time to match pairs of light and sound to solve a hidden word puzzle. Seven different games for 1 or 2 players. A delight for the eyes, ears and mind!

#34762 Atari 32K Tape or

#23814 Atari 32K Disk \$29.95

Over 2500 Programs for TRS-80, ATARI 400/800, APPLE, IBM, VIC 20 & C64

This is only a sampling of our sensational software!
CALL 800-424-2738 FOR OUR NEWEST PRODUCTS

UNDECIDED? NEED TO BUY A GIFT? The Program Store gift certificate may be purchased in any amount over \$10.00. Give the perfect gift!

VISIT OUR STORES

Southfield Plaza, 8500 West Seven Mile Ave., Littleton, CO
Terry Mall, 4200 Wisconsin Ave., NW, Washington, DC
Harvard Square, 15 Danvers St., Cambridge, MA
Mid West Plaza, 9600 Security Blvd., Baltimore, MD
White Flint Mall, Rockville Pike, Rockville, MD
Cherry Hill Mall, Rt. 38, Haddonfield Rd., Cherry Hill, NJ
Westwood Mall, Rt. 35, Wyckoff Rd., Easton, NJ

Willowbrook Mall, 1400 Willowbrook, Wayne, NJ
Hawthorne Mall, Rt. 58, Medford Hill, Roseland, NJ
Dunsmuir Plaza, 625 Belvoir Rd., Columbus, OH
Westmontland Mall, Rt. 38 East, Greensboro, PA
Montgomery Mall, 200 Montgomery Mall, North Wales, PA
Plymouth Meeting Mall, 580 Greensboro Pk., Plymouth Meeting, PA
Century 18 Mall, Rt. 51 & St. 60, West Hills, Borough, PA
Seven Centers Center, Falls Church, VA

COMING SOON TO:

CHICKS
OKLAHOMA CITY
ST. PETERSBURG
TAMPA
TULSA

FRANCHISE
OPENINGS IN
SELECTED CITIES

To Order Call Toll Free 800-424-2738

For Information Call (703) 556-9778

Mail-order: List computer item item # qty tape/disk item book price, shipping, tax & total
Send check or M.O. for total purchase plus \$2.00 shipping and handling. VA add 4% sales tax
Charge cards—include all embossed information. List name, address, city, state, zip & phone

SEND 25¢ FOR OUR COMPLETE COLOR COMPUTER CATALOG

THE PROGRAM STORE Dept. 10-11-3 Box 9582 4200 Wisconsin Avenue, NW Washington, D.C. 20016

THE PROGRAM STORE

© 1983 THE PROGRAM STORE

THE PROGRAM STORE

**YOUR HOME COMPUTER JUST GOT A WHOLE LOT SMARTER WITH THESE
SELECTED BOOKS FROM THE PROGRAM STORE'S
STOCK OF MORE THAN 500 BOOKS**



LEARNING MACHINE LANGUAGE

We find that many Atari owners become interested in learning about machine language. **MACHINE LANGUAGE FOR BEGINNERS** (#29822 \$12.95) will help you make the transition from BASIC to machine language with relative ease. The book assumes you know BASIC and shows you how to write machine language programs. Includes a BASIC program developed from writing machine language to disassembling it.

To start in machine or assembly language, you need an assembler and most people start with the **ATARI ASSEMBLER/EDITOR CARTRIDGE** (#14308 \$35.95). But its operating manual assumes that you already know assembly language. **THE ATARI ASSEMBLER BOOK** (#11002 \$14.95) by Don and Kurt Irm is an guide you through the rudiments in clear, easy steps.

As you become more interested in using assembly language, **6802 ASSEMBLY LANGUAGE SUBROUTINES** (#18605 \$17.95) is ideal. From Osborne/McGraw-Hill, Lance Levenski describes general 6802 programming methods and provides code for more than 40 subroutines which you can learn from and use. This book is excellent for those who learn best by examples.

INSIDE THE ATARI

If you are interested in how to get animation, scrolling screens, alternate character sets, player-missile graphics, new sounds, and other features the Atari is capable of, then you will need **OF THE ATARI** (#11730 \$19.95). This book, ready for a three ring binder, shows you how to exploit the many hardware and operating system features that make the Atari so tremendously versatile. The authors do this in an easy to read text with examples. If you want a more technical style, get Atari's **TECHNICAL REFERENCE NOTES MANUAL** (#20318 \$19.95). We strongly recommend this book to anyone doing assembly language programming.

The power to make your Atari beat **MAPPING THE ATARI** (#29621 \$24.95) shows how to use it. Ian Chisholm's extensive research for Computer Books resulted in this comprehensive resource, memory guide and learning aid. Completely cross-referenced with detailed tutorial commentary on all major memory locations, this book should be part of every machine language programmer's library.

SOURCE OF ALL PROGRAMS

Source listings provide you with the assembly language code of the original programmer. These are very useful to learn how a program works (e.g., BASIC), to learn how a professional programs, and to learn how to use the routines in your programs.

THE ATARI BASIC SOURCE BOOK (#19026 \$12.95) gives you not only a source listing, but also tells you everything you always wanted to know about the making of a computer language. Even BASIC programmers will enjoy reading about the details of how Atari BASIC works.

Similarly, **INSIDE ATARI DOS** (#29473 \$19.95) is the comprehensive manual on the disk file manager, commonly known as Atari DOS 2.0S.

Everyone, even the most accomplished BASIC programmer needs a good reference manual to get the most out of their computer. **YOUR ATARI COMPUTER** (#10629 \$17.95) provides a comprehensive, all-in-one guide for any user, beginner or expert. We recommend it over other texts because of its handy alphabetical glossary of statements and functions, its coverage of advanced BASIC and graphics, tips on hardware, peripherals and compatible software, and more!

ATARI GRAPHIC MAGIC

Almost every Atari owner is interested in programming more graphics. Graphics are one of the best features of the marvelous Atari and we have found three excellent books for almost any programmer.

NEW! Tom Rowley, in DESIGNS FROM YOUR MIWO (#36864 \$12.95), introduces shapes, colors, 3-D and screen com position with many sample programs. In the second part of this excellent tutorial he covers the advanced features of player missile graphics, collision registers, display list interrupts, character sets and animation. We highly recommend it.

COMPUTER'S FIRST BOOK OF ATARI GRAPHICS (#22746 \$12.95) has games, tutorials, programs and more collected together for the first time. You'll enjoy the many home-circled arties and learn the graphic tricks of many of the leading authors.

ATARI SOUND AND GRAPHICS (#20125 \$10.95) published by John Wiley is an excellent self-teaching guide for those learning BASIC. You'll compose and play melodies, draw cartoons, create sound effects and sample games while learning BASIC. A perfect gift for your favorite Atari user!

VISCALC USERS

If you're using **ATARI VISCALC** (#15938 \$19.95) or thinking about buying it, you'll want to learn more about its expanded uses in **THE VISCALC BOOK, ATARI EDITION** (#33382 \$14.95). Donald Bell understands that the power of VisCalc is designing good models so he shows you how to build a model, enter data and explore all aspects. The larger number of precise problems will increase your skills and understanding. Make VisCalc work for you!

And if you are looking for more examples, including home management, personal finance, general business and more, then you should get **VISCALC HOME AND OFFICE COMPANION** (#33719 \$15.95). It's one of our best sellers!

COMPUTER KIDS

For holiday gifts for the kids, you won't want to pass up **KIDS AND THE ATARI** (#43205 \$19.95) for the 10 to 14 year old who wants to become a computer wizard.

The younger kids will like **Creative's new addition to COMPIUTERS FOR KIDS, ATARI VERSION** (#31979 \$5.95). This BASIC programming manual includes the same fun-filled programs, "Score More with an Elephant". Detailed instructions and sketches plus a glossary of statements and commands, lesson plans, and tips for parents are included.

For the preschoolers, we suggest **COMPUTER PARADE** by D'Nez and is richly illustrated by Gellum (\$9.95, hardcover). Kate and her brother arrive in Cybern as just in time to learn how music is made from Colonel Byrle. This is the second in the extremely popular series of **KATE AND THE COMPUTER** (#10166 \$5.95, hardcover).

COMPUTERS FOR KIDS



**THE
PROGRAM STORE®**

```

500 , C:$$LEFT=$A
510 , R:auto-define the text variable
520 J:$PARSE
530 #ENDOLD GR:QUIT
540 T:(CLEAR)\
550 LOAD:$FILENAME
560 E:
570 #NDUN R:dummy module
580 #ADJECTIVE R:module
590 #MODEL GR:CLEAR
600 T:(CLEAR)
610 T:THE FLEECE WAS WHITE AS SNOW
620 T:THE FLEECE WAS WHITE AS SNOW
630 #FMODEL GR:PEN YELLOW
640 , GR:#D<90):PEN RED
650 , GR:#D<40):PEN BLUE
660 , C:#D=7\120
670 , SO:#D
680 , GR:GOTO #D-90,7\40-15;TURNTO 4
5
690 , GR:4(DRAW40;TURN90)
700 J(9B764=255):#FMODEL I keystroke
710 SO:0
720 J:RETURN

```

Program 3: MARY Text Program

```

10 R: D:MARY(3 SPACES)old text PILOT
program
20 T:(CLEAR)
30 T:MARY HAD A LITTLE LAMB
40 T:
50 T:MARY had a $LITTLE $LAMB.
60 T:It's $FLEECE was $WHITE as $SNO
W.
70 T:And everywhere that $MARY went,
80 T:The $LAMB was sure to $GO.
90 T:
100 T:(9 SPACES)THE END\
110 A:
120 LOAD D:TALES
130 E:

```

Use the handy
reader service cards
in the back of the
magazine for
information on
products advertised in

COMPUTE!

SUPER DISK

Floppy Disk Drive For VIC-20 & Commodore 64

Super Disk[®] is a Commodore compatible disk drive designed to interface to the various Commodore computers such as the PET[®], VIC-20[®] and the Commodore 64[®]. The disk drive is compatible to the model 4040, 2031, 1540, and the 1541 disk drives and recognizes programs generated on any of these disk drives. The capacities are comparable to those found on the Commodore drives, and Super Disk[®] recognizes the full instruction set of the Commodore drives. Super Disk[®] offers RAM area within the disk unit, a serial and an IEEE bus interface. (Software programs included.)

Call Toll Free 1-800-527-7573 For Latest Price Information.
In Texas Call: (214) 484-7836

Also Available:

Gemini-10 w/Interface	\$399.	V3K RAM	15
CPI Parallel Interface	65.	V8K RAM	39.
Expandport 3 VIC	25.	V16K RAM (Switchable)	69.
Expandport 6 VIC	55.	V24K RAM	99.
Expandport 4 C64	65.	CIE (IEEE for C64)	85.

CATALOG OF OTHER HARDWARE & SOFTWARE AVAILABLE ON REQUEST. We accept: VISA, Mastercharge, and AE

Southwest Micro Systems, Inc

2554 Southwell • Dallas, Texas 75229

¹Trademark of Commodore, Inc. ²Trademark of MSO

COMSTAR AIR[®] SHIPPING WITHIN 2 DAYS

SEND \$1.00 FOR COMPLETE LIST

VIC-20

16K RAM	\$59
CARDBOARD (3 SLOT EXP)	33
BANANA PRINTER (80 COLUMN)	225
DISPLAY MANAGER (40/80 COL) (WITH WORD PROC.)	89
RABBIT (EASTERN HOUSE) (VIC DR 64)	35
HES MODEM (WITH SOFTWARE) (VIC OR 64)	69
HES MON ASSEMBLER (C) (VIC OR 64)	29
DUST COVER (VIC, 64, 800, 400, 810, or 410)	7
QUICK BROWN FOX (C) (VIC OR 64)	54
SWORD OF FARGOAL (T) 21K	23

COM-64

ATARI

WORDPRO 3 - (S)	69	DAK RAM (FOR 400)	109
VIDEOPAK 80 (80 COLUMN)	159	48K RAM (FOR 400)	89
2-80 VIDEOPAK (WITH CPM)	259	MONKEY WRENCH II	52
6502 PROF. DEV SYSTEM (T)	29	JUMP MAN JR. (S)	29
PRACTICAL SPREAD SHEET (D)	42	ALLEN GROUP VOICE BOX (D) 40K	119
LASER STRIKE (T)	22	TECHNICAL NOTES	25
ELEMENTARY 64 (BOOK)	14	NEWPORT PROSTICK	23
TOTL LABEL (T) (VIC OR 64)	17	MICROBITS MODEM	159
JUMP MAN (D,T)	29	MICROBITS PRINTER INTERFACE	63
ROBBERS OF LOST TOMB (D,T)	21	DE RE ATARI (BOOK)	18
PORT APOCALYPSE (D,T)	26	VAL FORTH (D) 24K	45
JAWBREAKER (C)	26	STAR LEAGUE BASEBALL (D,T)24K	25
FRIGGER (D,T)	26	GOONKY KONG (C)	37
ANNIHILATOR (T)	18	DIS DISC (C)	18
TEMPLE OF APHAI (D,T)	18	ALOG PAGEWRITER (D) 32K	34

C - CASSETTE B - DISK

T - CASSETTE * MOST ITEMS

COMSTAR

P.O. BOX 1730 GOLETA CA 93116
(805) 964-4560

ORDERS ONLY: 800-558-8803

or send check or money order. VISA, MC add
3% Shipping—\$2 for software (add for
hardware) Call add 8% tax. CRO add \$7.50.

THE COMMODORE CHARACTER SET

Dan Carmichael, Assistant Editor

The character chart on the following pages contains all the character information you will need while programming your VIC-20 or your Commodore 64. Keep it by your computer for handy reference.

Here's a handy and essential chart, including information on decimal, hexadecimal, BASIC, 6502, ASCII, and screen POKE codes. Please note the following conventions:

BASIC – lists the BASIC (language) keyword tokens.

6502 – contains the numeric representation of the 6502 instruction set. Zero page operations are listed with ZZ. Immediate operations are listed with II. Others are listed with NNNN.

ASCII – contains the Commodore ASCII control and character codes.

Screen Display – lists the character codes for POKEing to the screen. Set 1 and Set 2 correspond to uppercase and lowercase, respectively. Both sets cannot be displayed on the screen at the same time. Switch to Set 2 by simultaneously holding down the SHIFT and COMMODORE keys or POKEing 53272,23. To return to uppercase again, press the SHIFT/COMMODORE keys or POKE 53272,21.

Screen display characters may also be displayed in reverse character mode by adding 128 to the values that are listed.

Standard ASCII – gives values for standard ASCII codes. These codes can be used for controlling printers or when standard ASCII values are needed, as in telecommunications applications.

STANDARD ASCII

- 1 start of heading
- 2 start of text
- 3 end of text
- 4 end of transmission
- 5 enquiry
- 6 acknowledge
- 7 bell
- 8 backspace
- 9 horizontal tabulation
- 10 line feed
- 11 vertical tabulation
- 12 form feed
- 13 carriage return
- 14 shift out
- 15 shift in
- 16 data link escape
- 17 device control 1 (X-on)
- 18 device control 2
- 19 device control 3 (X-off)
- 20 device control 4
- 21 negative acknowledge
- 22 synchronous idle
- 23 end of transmission block
- 24 cancel
- 25 end of medium
- 26 substitute
- 27 escape
- 28 file separator
- 29 group separator
- 30 record separator
- 31 unit operator

Alps Computer, Inc.

Price-performance leader! Includes 280A, 8" disk drives, 3 serial + 1 parallel port, Winchester port networking. Prices start below \$1500. DEALER / OEM inquiries invited.

SPECIALS ON INTEGRATED CIRCUITS

6502	745	10/ 8.95	50/ 4.55	100/ 6.15
6503A/6512A	840	10/ 7.55	50/ 7.35	100/ 6.90
6520 PIA	515	10/ 4.90	50/ 4.45	100/ 4.15
6522 WA	645	10/ 6.10	50/ 5.75	100/ 5.45
6532	790	10/ 7.40	50/ 7.00	100/ 6.60
2114-L200	245	25/ 2.30	100/ 2.15	
2716 EPROM	490	5/ 4.50	100/ 4.00	
2532 EPROM	690	5/ 6.75	100/ 6.45	
6116 PALCE CMOS RAM	690	5/ 6.75	100/ 6.45	
4164 SRAM			8 for 14	
4164 SRAM			6 for 10	
2048 Inverter Force 24 pin Socket (Scanline)				2.50

Hewlett Packard

Write or call for prices



Anchor Automation Signalman Modems



FREE SOURCE MEMBERSHIP WITH SIGNALMAN

All Signalman Modems are Direct Connect and include cables to connect to your computer and to the telephone. Signalman Modems provide the best price-performance values.

Order and OEM inquiries invited

Volkmann	(79)	55
RS232 or Atari Cable for Volkmann	(79)	0
Mark I RS232	(29)	9
Mark VI for IBM Personal Computer	(279)	170
Mark VII Auto Dial/Auto Answer	(159)	8
Mark XII Smart Model 1200/300	(399)	295

DC Hayes Smartmodem	219
OC Hayes Smartmodem 1200/300	529



PRDM QUEEN for VIC	170
Apple Emulator for Commodore 64	Call
STAT Statistics Package for C64	95
Solid Oak 2 Level Stand for C64 or VIC	29
DSB/VIC Switch (networking)	125
RACKPOT V.I.P. type capter for C64 or VIC	20
CARDBOARD/6 Motherboard - VIC	64
CARDBOARD/6 Motherboard - C64	56
CARDPRINT Printer Interface - C64/VIC	64
CARDBOARD/3ds Motherboard - VIC	32
CARDSD C64/MC Calculator Keypad	32
CARDRAM/16 RAM Expansion - VIC	64
Complete CARBID Line in stock	
OE and VIE IEEE Interfaces in stock	
BASM Compiler/Assembler for C64	89

APPLE - FRANKLIN ITEMS

KRAFT Apple Joystick	
16K RAM Card for Apple	59
Solid Oak 2 Level Stand for Apple	29
Serial Card for Apple	99
MPC RAM/80 Column card for IIE (AF/XT)	129
280 Software and CP/M (Microsoft)	235
RAMA Data I with Controller	369
Parallel Printer Interface/Cable	79
Apple Duplicating (Microdot) Printer Interface	115
Apple Duplicating with 16K Buffer	160
Graphics + Interface	129
Kraft Products for Apple in stock	
OC Hayes Micromodem II	299
FFR: File	100
FFR: Report	100
Videx 80 Column Card	205
Apple Software for Apple 20% OFF	
Happy Blue Book	19

Commodore

See us for Personal, Business, and Educational requirements. Educational Discounts available.

PETSCAN I \$245 base price

Allows you to connect up to 30 COM/FET Computers to shared disk drives and printers. Completely transparent to the user. Perfect for schools or multiple word processing applications. Basic configuration supports 2 computers. Additional computer lookups \$100 each.

COMPACT/STCP \$115

Intelligent Terminal Package for PET, C64, C65 Includes ACIA Hardware / STCP Software

VE-2 IEEE to Parallel Interface 110

Includes cable, power supply, full 8-bit transmission, and switch selectable character conversion to ASCII

VIED ENHANCER for Commodore 64 59

Realize video quality equal or better than composite input using standard color TV

SCREENMAKER BD Column Adapter for C64 145

Provides big screen capability for business applications

GENESIS Computer Corp

VICentrol (for C64 as well) 50

compatible with BSR modules for home or business control

CONSENSE Remote Sensing Adapter for C64 or VIC 39

CDM VOICE Synthesizer for C64 or VIC 155

includes software for text to speech, batch echo

COM CLOCK Real Time Clock with battery backup 45

VIC 29 Products and Software in stock

Three C64 Software 100

ABACUS Software HES Software 27

16K RAM for VIC 64 Vanilla Pilot

VICTORY Software for VIC and C64

Street Sweeper (VIC) 12

Kong Kong (VIC) 16

Night Rider (VIC) 11

Cosmic Sebris (VIC) 12

Annihilator 16

Adventure Pack II 16

Metamorphosis 11

Educational Pack I 16

Trick 12

Strategy Pack I 16

Grave Robbers 12

PAPER CLIP Word Processor 109

ORACLE Data Base from Rolloffs included 125

Commodore 64 Programs Reference Guide 16

MicroChess for C64—8 levels of play 19

Computer's first book of PET/COM 11

C64 or VIC SWITCH 125

POWER ROM Utilities for PET/COM 78

WordPro 3.1/64 69

WordPro 4+—8032, disk, printer 295

SPELLMASTER spelling checker for WordPro

VISCALINK for PET, Atari or Apple 180

PET-TIAK PET to Epson Graphics Software 40

SM-KIT enhanced PET/COM ROM Utilities 35

Programmer's Toolkit - PET ROM Utilities 40

EASY CALL for C64 36

PET Spacewalker II ROM Switch 65

CDPWRITER Word Processor for C64 49

2 Meter PET to IEEE or IEEE to IEEE Cable 80

Out Cover for PET, C64, 4040, or 8050 8

C64 Interfaces (AGA1800, ADA1450, SAG1 in stock) 20

Programming the PET/COM (Complete) — R West 11

Complete First Book of VIC 63

HES M8000 with Software

HES Software and Hardware in stock

UMI products in stock

GRIBURNER (HES) VIC or C64 29

COCO (HES) Tutorial for C64 39

Public Domain Disks for C64 65

Aggressor (HES) 29

HES Turtle Graphics VIC 29 D64 49

HES Writer VIC 30 D64 34

Grand Master Chess (UMI) C64 or VIC 27

Renaissance (HES) VIC 29 D64 34

Synthesizer (UMI) 44

HES MUN VIC or C64 29

6502 Professional Development System (HES) 24

Robot Pain 29

Pratt's Pet 29

Robot Ball 29

DISK SPECIALS



Scratch (3M) 5" 1/4 disk	10/ 2.20	50/ 2.00	100/ 1.95
Scratch (3M) 5" 1/4 disk	10/ 3.05	50/ 2.80	100/ 2.75
Scratch (3M) 5" 1/4 disk	10/ 3.30	50/ 3.10	100/ 2.90
Scratch (3M) 8" 1/4 disk	10/ 2.85	50/ 2.70	100/ 2.65

We stock VERBATIM DISKS

Write for Dealer and OEM prices.

Verbatim 5" 1/4 disk	10/ 1.90	50/ 1.85	100/ 1.80
Verbatim 8" 1/4 disk	10/ 2.50	50/ 2.50	100/ 2.45

We stock Dysan disks

Webster 5" 1/4 disk	10/ 1.60	50/ 1.55	100/ 1.45
Webster 5" 1/4 disk	10/ 1.90	50/ 1.85	100/ 1.75
Webster 8" 1/4 disk	10/ 2.00	50/ 1.95	100/ 1.85

We stock MAXELL DISKS

Write for dealer and OEM prices.

Disk Storage Pages	10 for \$5	Hub Rings 50 for \$6
Disk Library Cases	8"—3.00	5"—2.25
Head Cleaning Kits	11	

CASSETTE TAPES—AGFA PE-611 PREMIUM

C-10	10/ 61	50/ 58	100/ 50
C-30	10/ 85	50/ 82	100/ 74

BATASHIELD BACKUP POWER SOURCE 265

Battery backup unit. Unlimited Power Supply with surge and noise filtering. The answer to your power problems.

Zenith ZVM-121 Green Phosphor Monitor 95

Zenith ease color and monochrome monitors in stock

MultiBase—IBM or Apple 165

Guardpost for IBM available

Flashcast 5000 Software Package 219

PF5 Software for IBM and Apple in stock

VOTRAX Personal Speech System 280

VOICE BOX Speech Synthesizer (Apple or Atari)

CompScribe Substation (5 hours) 35

Dyan Printer/64-16 Relay Wired Printer 450

Rob Printer/Parallel Printer

Panasonic 1040 Printer with Correspondence Mode 319

USI Compimod 4 R F Modulator 39

Daisywriter 2020 with 48K buffer 1050

Many printers available (Screen-Star, Brother, OK, etc.)

We Stock AMDEK Monitors

Amdek D0Y-100 Printer 590

A P Products 15% Off

Watanabe Intelligent Printer 960 6-pin 1290

HR00K3 500 Series Squeeze/Squeeze/Noise Filter 54

We stock Electronic Monitors

System SYM-1 Microcomputer 189

ALL BOOK AND SOFTWARE PRICES DISCOUNTED

Panasonic 12" Monitor (20 MHz) with audio 139

Panasonic CT-1603 Dual Mode Color Monitor 259

USI Video Monitors—Green or AMREN 20 MHz 1/2 in.

Dealer and OEM inquiries invited

ZENITH data systems

HERO I Robot (factory assembled) 2145

229 Terminal (OEM and AOM compatible) 680

27-10 Intel Terminal with Serial Port 340

Z100 16-bit/8-bit Systems in stock

We stock entire Zenith line



WE STOCK ENTIRE LINE—write for prices.

Software for Atari in stock.

215-822-7727

252 Bethlehem Pike
Colmar, PA 18915

A B Computers

WRITE FOR CATALOG. Add \$1.50 per order for United Parcel.

We pay balance of UPS online shipping charges on all prepaid orders.

(add extra for mail, APO/FPO, air). Prices include cash discount.

Regular prices slightly higher. Prices subject to change.

OAK STANO-C64, VIC, Apple, Atari 29
Beautiful natural solid oak two-level stand. Rests on table
your computer. Holds disk drives/cassette deck, as well as
your monitor/TV

KMMN Pascal IV.1 for PET/CBM/C64 \$95
Full-featured Pascal for Commodore Computers.
Now suitable for all Advanced Placement Courses
includes all features of full-Janus-With Pascal except WIDTH,
SETS, RECORD VARIANCE (plus has STANO extension)
includes machine language Pascal Source Editor (with Syntax
checking), machine language P-Code Compiler, P-Code to
machine language Translator or optimized object code Run-
time package, User Manual, and sample programs
Requires 32K. Please specify configuration

EARL for PET (disk file based) \$65
Editor, Assembler, Debugger, Linker
Generates relocatable object using MOS Technology
memories. Disk file input (can edit files larger than memory)



Paper Clip (Batteries Included)
Extremely comprehensive word processor for Commodore and
Commodore 64 computers. Has features of WordPro plus
advanced features like horizontal scroll column move, column
arithmetic, column sort, and comprehensive printer support

Dolph's ORACLE (Batteries Included)
Comprehensive Data Base, Report Writer, Mail Label system
showing large record size (over 8000 characters) with the
number of records in a file limited only by disk capacity (7.5
MB on 9090 drive). Fast machine language routines, fully
multitasked sort

Super BusCard (Batteries Included)
• full buffered IEEE-488 bus for speed
• cartridge extension slot
• parallel printer port
• DOS "wedge" commands included
• machine language monitor included
• room for 24K ROM BASIC-4.0 (optional)

RAM/ROM for PET/CBM
4K or 8K bytes of soft ROM optional battery
backup.

Use RAM/ROM as a software development tool to store data
or machine code beyond the normal BASIC range, or to load a
ROM image to avoid ROM socket contacts. Possible appli-
cations include machine language sort (such as SUPER-
SORT), universal wedge, Extremes, etc.
RAM/ROM — 4K \$75 RAM/ROM — 8K 90
Battery Backup Option 20

PORTMAK QUALRS32 SERIAL PORT \$63
Two ports with full bipolar RS232C buffering. Baud rates from
300 to 4800. For PET/CBM, AIM, SYM

SuperGraphics 2.0
NEW Version with TURTLE GRAPHICS
SuperGraphics, by John Flaherty, provides a 4K machine
language extension which adds 35 commands to Commodore
BASIC to allow fast and easy plotting and manipulation of
graphics and shapes in the PET/CBM video display
SOUND commands allow you to indicate notes or songs
from BASIC, and then play them in the background mode
without interfering with your BASIC program

Additionally, seven new TURTLE commands open up a
whole new dimension in graphics
Specify machine model (and size), ROM type
SuperGraphics in ROM (\$4000 or \$9000) \$45
Volume discounts available for schools

FLEX-FILE
for PET/CBM Computers

NEW
VERSION 2
now for C64

FLEX-FILE is a set of flexible, friendly programs to allow you to
set up and maintain a data base. Includes versatile Record
Writer and Mail Label routines, and documentation for pro-
grammers to use Data Base routines as part of other pro-
grams
RANDOM ACCESS DATA BASE
Record size limit is 256 characters. The number of records per
disk is limited only by record size and free space on the disk
File maintenance lets you flip forward or backward through a
file, add, delete or change a record, go to a numbered record or
find a record by specified field (or partial field). Field lengths
may vary to allow maximum information packing. Both sub-
fields and key fields can be used up to 15 fields deep. Any field
may be specified as a key. Sequential file input and output, as
well as file output in WordPro and PaperMate format is sup-
ported. Record size, fields per record and order of fields may be
changed easily

MAILING LABELS
Typical mail records may be packed 3000 per disk on 8050
(1400 on 4040). Labels may be printed any number wide, and
may begin in any column position. There is no limit on the num-
ber or order of fields on a label, and complete record selection
via type code or field condition is supported

REPORT WRITER
Flexible printing format, including field placement, decimal
justification and rounding. Define any column as a series of
right or left functions performed on other columns, and pass
results such as summing data from row to row. Totals, weighted
averages, and averages supported. Complete record selection
including field within range, pattern match, and logical func-
tions can be specified

FLEX-FILE 2 by Michael Riley \$110
C64/64, PET/CBM/VIC—32K, Disk, Specify configuration

SCREEN MAKER (cogs microtech) \$149
80 Column Adapter for Commodore 64
Expand your computer for business applications. Provides 80
column X 24 line display in a 2K video RAM. Linking
software provided

Copy-Writer Word Processor \$69
Full-featured professional word processor with over 800 lines
of code per memory load on C64. Has features not available in
many word processors such as double-column printing, built in
graphic capability, shorthand notations, and ability to support
all printer codes

SPECIAL COMBINATION PACKAGE \$200
Includes SCREEN MAKER AND Copy-Writer for C64

PROGRAM YOUR OWN EPROMS \$75
Branding Iron EPROM Programmer for PET/CBM software for
all ROM versions. Includes all hardware and software to pro-
gram or copy 2716 and 2752 EPROMs

DISK I.C.U. \$40
Intensive Car Unit by L.C. Cargile

COMPLETE DISK RECOVERY SYSTEM FOR C64 DRIVES
Edit disk blocks with ease, duplicate disks, skipping over
bad blocks, un-scratch scratched files, check and correct
scrambled files, recover improperly closed files
Includes complete diagnostic facilities, extensive treat-
ment of relative file, optional output to IEEE488 printer and
comprehensive user manual (an excellent tutorial on disk
operation and theory)
Furnished on copy-protected disk with manual
Backup disk available, \$10 additional

CBM Software
SUBSORT for PET/CBM 35
—excellent general purpose machine language sort routine
COMAL Package for COM 23
—includes software on disk, and Comal Handbook
BASIC INTERPRETER for COM 6080 \$95
PEDISIM II Systems from cogs Microtech available.
FILEX IBM 3741/2 Data Exchange Software available.
JANSIM Data Base Management System for COM.
CASH MANAGEMENT SYSTEM for COM \$45
PeteSpeed BASIC Compiler 120
Integer BASIC Compiler 120
80K Assembler Modules 280
UCSD Pascal (without board) 135
Wordcraft 80 or 8096 255

FORTH for PET \$50
By L.C. Cargile and Michael Riley
Features include:
— full PET FORTH model
— all FORTH 79 STANFORD extensions
— structured (6502 Assembler with nested decision
macros)
— full screen editing (just as in BASIC)
— standard report key
— sample programs
— auto sized screens (16 lines by 64 characters)
— 150 screens per diskette on 4040, 4080 screens on
8050
— ability to read and write BASIC sequential files
— introductory manual and reference manual

For Commodore 64, use any 16K/32K PET/CBM with ROM 3 or
4, and CBM disk drive. Please specify configuration when
ordering
Metacompiler for FORTH \$30
Simple metacompiler for creating compact object code
which can be run independently (without FORTH system)



PageMate
60 COMMADO
WORD
PROCESSOR
by Michael Riley

Page-Mate is a full-featured word processor for Com-
modore computers. Page-Mate incorporates 50 commands to
give you full screen editing with graphics for all 16K or 32K
machines (including 8032), all printers, and disk or tape drives.
Many additional features are available (including most capabil-
ities of WordPro 3)

Page-Mate functions with all Commodore machines with at
least 16K, with any printer, and either cassette or disk.
To order Page-Mate, please specify machine and ROM type.
Page-Mate (disk or tape) for PET, CBM, VIC, C64 \$40

SM-KIT for PET/CBM \$40
Enhanced ROM based utilities for BASIC 4 (includes edh pro-
gramming aids and disk handling commands)

STAT for PET/CBM and C64 95
Comprehensive Statistical Analysis Routines
Includes complete disk-based handling routines. Features
normal, T, Chi-Square, F, binomial, Poisson, and exponential
distributions, one way ANOVA, two way ANOVA, contingency
analysis, linear regression, data transformation, histogram
curve, and scatter plotting, and random sample data gen-
eration
Specify machine type and drive when ordering

Commodore 64
Hunter-Killer - Commodore 64 15
— authentic naval warfare game (complete with sound)
BASM Compiler and Assembler 85
WordPro 3+164 75
Visual Plot for Text Graphics 27
— also includes sound, fonts, joystick support
Commodore 64 Programmer Reference Guide 26
EARLY GAMES for Young Children 15
PETSPED Compiler C64 120
CALC RESULT ADVANCED Spread Sheet Package 135
1000 Miles (White Bombs Game) 9
MicroChess 16
Adventure (disk) 45
PILOT 64 9
LOGO 64 45
Easy Calc 64 55
Mile Assembler - C64 85
Synth-64 text and sound synthesizer 25
Tiny BASIC Compiler 17
Assembly Language Tutorial - C64/VIC 22
SuperGraphics-64 adds BASIC Graphics 27
Abacus Software in stock



All Victory Software is stock

215-822-7727

252 Bethlehem Pike
Colmar, PA 18915

A B Computers

WRITE FOR CATALOG. Add \$1.50 per order for United Parcel
We pay balance of UPS surface shipping charges on all prepaid orders
(add extra for mail, APO/FFO, air). Prices include cash discount.
Regular prices slightly higher. Prices subject to change.

DEC	HEX	BASIC	6502	ASCII	SCREEN DISPLAY SET 1 SET 2	DEC	HEX	BASIC	6502	ASCII	SCREEN DISPLAY SET 1 SET 2
0	0	END LINE	BRIK		@	64	40	0x	00	0	
1	1		ORA (\$ZZ)		A a	65	41	A	00 (\$ZZ)	A	A
2	2				B b	66	42	B		B	B
3	3				C c	67	43	C		C	C
4	4				D d	68	44	D		D	D
5	5		ORA \$ZZ	white	E e	69	45	E	00 (\$ZZ)	E	E
6	6		ASL \$ZZ		F f	70	46	F	LSR \$ZZ	F	F
7	7				G g	71	47	G		G	G
8	8		PHP	disables shift/Cmd	H h	72	48	H	PHA	H	H
9	9		ORA #58	enables shift/Cmd	I i	73	49	I	00 #58	I	I
10	A		ASL		J j	74	4A	J	LSR	J	J
11	B				K k	75	4B	K		K	K
12	C				L l	76	4C	L	JMP \$NNNN	L	L
13	D		ORA \$NNNN	return	M m	77	4D	M	00 \$NNNN	M	M
14	E		ASL \$NNNN	lowercase	N n	78	4E	N	LSR \$NNNN	N	N
15	F				O o	79	4F	O		O	O
16	10		0PL \$NNNN		P p	80	50	P	0VC \$NN	P	P
17	11		ORA (\$ZZ)	ctrl down	Q q	81	51	Q	00 (\$ZZ)	Q	Q
18	12			reverse on	R r	82	52	R		R	R
19	13			ctrl home	S s	83	53	S		S	S
20	14			ctrl del	T t	84	54	T		T	T
21	15		ORA \$ZZX		U u	85	55	U	00 \$ZZX	U	U
22	16		ASL \$ZZX		V v	86	56	V	LSR \$ZZX	V	V
23	17				W w	87	57	W		W	W
24	18		CLC		X x	88	58	X	00	X	X
25	19		ORA \$NNNNLY		Y y	89	59	Y	00 \$ZZY	Y	Y
26	1A				Z z	90	5A	Z		Z	Z
27	1B				[	91	5B	[[[
28	1C			red	[	92	5C	[[[
29	1D		ORA \$NNNNLX	ctrl right	]	93	5D	]	00 \$NNNNLX]]
30	1E		ASL \$NNNNLX	green	]	94	5E	]	LSR \$NNNNLX]]
31	1F			blue	-	95	5F	-		-	-
32	20	SPACE	0PL \$NNNN	space	0000	96	60		015	0000	0000
33	21		AND (\$ZZ)		]	97	61		ADC (\$ZZ)]]
34	22				-	98	62			-	-
35	23				#	99	63			#	#
36	24		BIT \$ZZ		0	100	64			0	0
37	25		AND \$ZZ		%	101	65		ADC \$ZZ	%	%
38	26		ROL \$ZZ		&	102	66		00R \$ZZ	&	&
39	27				-	103	67			-	-
40	28		PLP		[	104	68		PLA	[[
41	29		ORA #58		]	105	69		ADC #58]]
42	2A		ROL		-	106	6A		00R	-	-
43	2B				+	107	6B			+	+
44	2C		BIT \$NNNN		-	108	6C		JMP (\$NNNN)	-	-
45	2D		AND \$NNNN		-	109	6D		ADC \$NNNN	-	-
46	2E		ROL \$NNNN		-	110	6E		00R \$NNNN	-	-
47	2F				/	111	6F			/	/
48	30		0PL \$NN		0	112	70		BVS \$NN	0	0
49	31		AND (\$ZZ)		1	113	71		ADC (\$ZZ)	1	1
50	32				2	114	72			2	2
51	33				3	115	73			3	3
52	34				4	116	74			4	4
53	35		AND \$ZZX		5	117	75		ADC \$ZZX	5	5
54	36		ROL \$ZZX		6	118	76		00R \$ZZX	6	6
55	37				7	119	77			7	7
56	38		SEC		8	120	78		SEI	8	8
57	39		AND \$NNNNLY		9	121	79		ADC \$NNNNLY	9	9
58	3A				-	122	7A			-	-
59	3B				-	123	7B			-	-
60	3C				-	124	7C			-	-
61	3D		AND \$NNNNLX		=	125	7D		ADC \$NNNNLX	=	=
62	3E		ROL \$NNNNLX		>	126	7E		00R \$NNNNLX	>	>
63	3F				?	127	7F			?	?

ADDITIONAL NOTES: SCREEN CODES: CODES 128-255 are reversed images of CODES 0-127

Now There's An Alternative Floppy Disk Drive For Commodore Computers!

Super Disk is a Commodore compatible disk drive designed to interface to the various Commodore computers such as the PET, VIC-20, and the Commodore 64. The disk drive is compatible to the model 4040, 2031, 1540, and 1541 disk drives and recognizes programs generated on any of these disk drives. The capacities are comparable to those found on the Commodore drives, and Super Disk recognizes the full instruction set of the Commodore drives. Super Disk offers 8K RAM area within the disk unit, and a serial and an IEEE bus interface. The following technical specifications apply to Super Disk.

Disk Parameters: 5.25 inch single-sided, double density diskette media; number of tracks — 35; number of sectors per track — 17 to 21 (variable); sector size — 256 bytes; number of sectors per disk — 683.

Capacities: User sectors per disk — 667; disk capacity — 174,048; data capacity — 168,656; relative data capacity — 167,132; program capacity — 168,656; directory capacity — 144 filenames.

Electrical Interface: Power requirements — input voltage — 110/220 volts $\pm 10\%$; frequency — 50 or 60 Hertz; power — 30 watts. Computer interface — Commodore type SERIAL bus or Commodore type IEEE bus.

System Features: 16K ROM based operating system; 8K RAM area; 6510 Microprocessor; Power on self test diagnostics.



SINGLE DRIVE



DUAL DRIVE

Features

- Single or dual drives
- Reliable; proven drive mechanism
- Comes with both serial and IEEE bus ports
- Serial configuration compatible with Commodore 1541
- IEEE configuration compatible with Commodore 2031 and 4040
- Disk formats in less than 20 seconds
- Power on self-test diagnostics
- 8K RAM, 16K operating system

MSD Also Manufactures IEEE Interfaces and Cables
For Commodore 64™ and VIC 20™

Designed For The Serious User

A Premium Drive At A Slightly Higher Price



(214) 241-3743

11105 Shady Trail • Suite 104 • Dallas, Texas 75229

Call Toll Free

1-800-527-5285

For Purchase Information

PET, VIC 20 and Commodore 64 are trademarks of Commodore Business Machines, Inc. Super Disk is a copyright of Micro Systems Development, Inc.

Unbelievable



Commodore 64

Avalon Hill Game Company

160 701 B-1 Nuclear Bomber (C)	\$12
160 702 Midway Campaign (C)	\$12
160 703 North Atlantic	
Comedy Reader (C)	\$12
160 704 Rulemaker (C)	\$12
160 706 Planet Miners (C)	\$12
160 712 Computer Stocks & Bonds (C)	\$15
160 716 Andromeda Conquest (C)	\$14
181 721 Computer	
Football Strategy (C)	\$12
181 732 Telegaid (C)	\$16

Broderbund

Daniel & Midnight Magic	\$23
Choplifter (C)	\$34
Serpentine (C)	\$27
Sea Fox (C)	\$27

Datamost

Roundabout	\$20
Blackout	\$20
Mining Zone	\$20

Don't Ask Computer Software

Wordbase	(C) \$ 20, (C) \$ 23
----------	----------------------

EPX/Automated Simulations

145 636 Jump Man (C)	\$27
----------------------	------

Human Engineered Software (HES)

6502 Professional Dev. System (C)	\$ 23
Retro Ball (C)	\$ 27
Hesmo (C)	\$ 27
Turtle Graphics II (C)	\$ 45
Hexwiter 64 (C)	\$ 27
Gridrunner (C)	\$ 27

Infocom

Zork I, II, III	\$ 37
Deadline (C)	\$ 34
Starcross (C)	\$ 27
Witless	\$ 34

Sierra On-Line

Frogger (C)	\$ 25
Crossfire	\$ 15
Key Breaker	\$ 20
Thrashin' (C)	\$ 27
Shermy Light Foot (C)	\$ 25

Sirius Software

Blade of Blackspoke (C)	\$ 27
Type Attack (C)	\$ 27
Repton (C)	\$ 27
Critical Mass (C)	\$ 27
Snake Byte (C)	\$ 23
Bandits	\$ 27
Squash'em (C)	\$ 27
Final Orbit (C)	\$ 23

Spinnaker

Shooter Troops #1 (C)	\$ 30
Facemaker (C)	\$ 23
Kindercomp (C)	\$ 20
Hey Diddle Diddle	\$ 20
In Search of the Most Amazing Thing	\$ 27
Fraction Fever (C)	\$ 20
Alphabet Zoo (C)	\$ 20
Della Drawing (C)	\$ 20

Synapse Software

Pt. Apocalypse	(C) \$ 25, (C) \$ 23
Dreifs	(C) \$ 25, (C) \$ 23
Survivor	(C) \$ 25, (C) \$ 23
Pharaoh's Curse	(C) \$ 25, (C) \$ 23

United Microware Industries

92E 302 Renaissance (C)	\$ 20
92E 331 Motor Mania (C)	\$ 20

Commodore 64	\$219
VIC 20	\$ 99
1525 Printer	\$229
1530 Datasette	\$ 64
1541 Disk Drive	\$249
1600 Modem	\$ 89
1701 Commodore Monitor	\$289
VIC 1311 Joystick	\$ 8
VIC 1312 Game Paddles	\$ 16

VIC 1210 8K Memory Expander	\$34
VIC 1310 8K Memory Expander	\$32
VIC 1311 16K Memory Expander	\$39
VIC 1011 RS-232 Terminal Interface	\$43
VIC 1211 Super Expander	\$59
VT 100A Recreation Pack	\$ 45
VT 107A Home Calculation Pack	\$ 45
VG 1600 Videomem	\$ 89
VM Programmer's Reference Guide	\$ 14
Commodore Programmer's Ref. Guide	\$ 16

Educational

Books

Kids and the Vic	\$ 15
Programmer's Reference Guide (Vic)	\$ 14
Programmer's Reference Guide (64)	\$ 15

Language Arts

Super Hangman (C)	\$ 14
Sentence Cases (C)	\$ 13
Concentration (C)	\$ 13
Home Babysitting	\$ 23

Math

Sky Math (C)	\$ 12
Space Division	\$ 12
Bingo Speed Math (C)	\$ 23
Number Clutch (C)	\$ 23
Number Chaser	\$ 17
Number Gallop	\$ 17

Music

Vic Music Computer (C)	\$ 42
HES Synthesound (C)	\$ 49

Reading and Language Arts

Finger Spelling (C)	\$ 12
My Spelling Book (Ages 3-10)	\$ 26

Programming Techniques

Intro to Basic Prog. I	\$ 23
Intro to Basic Prog. II	\$ 22
Programmer's Aid Card	\$ 22
Turtle Graphics/Hes (C)	\$ 29
Go! and the Microchip	\$ 23

Social Studies/Science

Visible Solar System	\$ 23
Reaganomics (C)	\$ 27

Commodore Software

Adventureland	\$ 29
Pirate Cove	\$ 29
Mission Impossible	\$ 29
The Count	\$ 29
Voodoo Castle	\$ 23
The Sky is Falling	\$ 23
Mole Attack	\$ 23
Bingo Speed Math	\$ 23
Home Babysitter	\$ 23
Visible Solar System	\$ 23
Personal Finance	\$ 29
Quick Brown Fox	\$ 23

Call Toll Free

1-800-634-6766

Order Line Only - Ask for Operator C058

1095 E. Twain (702) 796-0296
Las Vegas, Nevada 89109

Information & Order Inquiries
(702) 369-5523

We accept VISA and MasterCard
Mon. - Fri. 8 A.M. to 6 P.M.
Sat. 9 A.M. to 6 P.M.

Dealers' Inquiries Invited

Vic 20

Avalon Hill

Tank Arcade	\$ 12
Nuke War	\$ 12

Automated Simulations

Rescue at Point (C)	\$20
Picochet (C)	\$15
Monster Maze (C)	\$27
Sword of Falgout	\$27

Broderbund

Marion Reader	\$15
MultiSound Synthesizer	\$15
Shark Trap	\$15
Sky Blazer (C)	\$27
Sea Fox (C)	\$27
A.E. (C)	\$27

Creative Software

Black Hole (C)	\$ 36
Treshmen (C)	\$ 36
Astroblast (C)	\$ 36
City Bomber & Minerfield (C)	\$ 20
Apple Panic (C)	\$ 36
Serpentine (C)	\$ 36
Choplifter (C)	\$ 36
Tenagard (C)	\$ 36
Household Finance	\$ 36

HES Software

HES Mon (C)	\$ 29
HES Writer (C)	\$ 29
Synthesound Music Synthesizer (C)	\$ 49
Turtle Graphics (C)	\$ 29
VIC Porth (C)	\$ 45
Victrek (C)	\$ 15
Predator (C)	\$ 27

Sirius

Type Attack	\$27
Snake Byte	\$27

Thom EMI

River Rescue (C)	\$ 29
Mutant Hard (C)	\$ 29

Tronix

Galactic Blitz (C)	\$17
Swarm (C)	\$20
Scrambler (C)	\$20
Sold Fever (C)	\$27
Dandy Skies (C)	\$27

United Microware

Spiders of Mars (C)	\$ 34
Motor Run (C)	\$ 34
Amok	(C) \$ 15 (C) \$ 27
Alien Blitz	(C) \$ 17 (C) \$ 27
Skymath (C)	\$ 12
Space Division (C)	\$ 12
Super Hangman (C)	\$ 14
The Alien (C)	\$ 17
3D Maze (C)	\$ 12
Kosmic Kamikaze (C)	\$ 17
Sub Chase (C)	\$ 15
Renaissance	\$ 20
Cosmic Blast (C)	\$ 27
Satellites & Meteorites (C)	\$ 34
Outward (C)	\$ 36
Wordcraft	\$ 66



Great Savings!

600XL ... CALL
800XL ... CALL
1400XL ... CALL
1450XLD ... CALL

Atari Inc.

1010 Recorder	\$ 72
1050 Disk Drive	\$329
1027 Printer	Call
1025 Printer	\$459
630 Modem	\$145
660 Interface	\$150
Entertainment System	\$ 54
482 Computer	\$112
483 Programmer	\$ 52
Communicator II	\$169
Alan Accounting	\$289
CD404 Mailing List	\$ 42
CDL 4007 Music Composer	\$ 42
Programming 2 & 3	\$ 22
Conversational Languages	\$ 56
CD4016 Pilot	\$ 42
CD405 Pilot	\$ 42
CDL4003 Assembly Editor	\$ 62
CDL706 Microsoft Basic II	\$ 30
CDL4022 Pac Man	\$ 30
CDL4020 Compade	\$ 30
CDL4008 Super Breakout	\$ 26
CDL4008 Space Invaders	\$ 26
CDL4009 Computer Chess	\$ 26
CDL4011 Star Raiders	\$ 26
CDL4012 Missile Command	\$ 26
CDL4013 Asteroids	\$102
The Bookkeeper	\$ 65
Home Filing Manager	\$ 54
Alan Speed Reading	\$ 55
Home Manager Kit	\$ 55
Family Finance	\$ 23
Time Wise	\$ 23
Defender	\$ 30
Paint	\$ 30
Qix	\$ 30
Dr. Dog	\$ 30
ET Phone Home	\$ 65
Atari Writer	\$ 36
Donkey Kong	\$ 36
Donkey Kong Jr.	\$ 36
Alan Logo	\$ 72
Mickey in the Great Outdoors	\$ 34
My First Alphabet	\$ 25
Peter Pan's Daring Escape	\$ 34

Business & Utilities

Visicalc	\$169
Computer's Financial Wizard	\$ 45
Color Accountant	\$ 65
Mail Merge	\$ 20
Data Perfect	\$ 95
Letter Perfect	\$105
Bank Street Writer	\$ 45
Text Wizard	\$ 55
File Manager 800+	\$ 65
Datam 852.0	\$ 59
Sp. Assembler	\$ 34
K. Doc	\$ 59
Link Interpreter	\$ 79
Basic Compiler	\$ 55
Datalink	\$ 27
Alan World	\$ 27
Color Print	\$ 17
Graphics Generator	\$ 37
Microprinter	\$ 23
Graphics Master	\$ 17
P.M.P. Property Management	\$145

Modems

Hayes Smartmodem 300 Baud	\$209
Hayes Smartmodem 1200	\$499
Signamax Modem B	\$ 79
Alan 830 Modem	\$155



Educational

Pre-School		Computers	
Savvy the Sea Serpent (C)	\$ 10 (D) \$ 19	Memory Builder	(C) \$ 17 (D) \$ 23
Pre-School G. Builder	(C) \$ 13 (D) \$ 24	Concentration	(C) \$ 13 (D) \$ 19
My First Alphabet (D)	\$ 26	Let's Spell (C)	\$ 13
Allen Counter/Place Flash (D, C)	\$ 26	Do It Yourself Spelling (C)	\$ 13
Bumpy Dumpty (C & JH)	\$ 25	S.A.T. College Board Prep (C)	\$ 69
Facemaker (D)	\$ 23	Vocabulary Builder I	(C) \$ 13 (D) \$ 19
Juggles Rainbow (D, C)	\$ 22	Fishing for Homonyms (C)	\$ 13
Juggles House	\$ 22	Key Diddle Diddle (D)	\$ 30
Alphabet Zoo (CT)	\$ 20	Story Machine (D)	\$ 23
Music		Crossword Magic (D)	
Musik Composer (CT)	\$ 42	Delta Drawing (CT)	\$ 23
Jerry White Music Lessons (D)	\$ 20		
Magic Melody Box	\$ 14		
Social Studies and Geography		Programming Techniques	
GlobeMaster (D)	\$ 27	Plain (C) of Education	(C) \$ 59 (D) \$ 99
States and Capitals (C)	\$ 12	Invitation to Prog. (D)	\$ 22
European Countries and Capitals (D)	\$ 12	Invitation to Prog. (D)	\$ 22
Math		Tricky Trivia — Ed Software	
Monkey Up A Tree (D, C)	\$19	TT#1 Display Logic (C, D)	\$ 17
Video Math Flash Cards (D, C)	\$13	TT#2 Horizontal Scrolling (C, D)	\$ 17
Algebra 101	\$19	TT#3 Page Flipping (C, D)	\$ 17
Computath Practice (C) (D) (C) (D)	\$19	TT#4 Basics of Animation (C, D)	\$ 17
Computath Bernals (C) (D) (C) (D)	\$19	TT#5 Page Mosaic Graphics (C, D)	\$ 24
Got Class? Computer (C) (D)	\$19	TT#6 Sound & Music (C, D)	\$ 24
Cash Register	(C) \$13 (D) \$19	TT#7 Disk Utilities (C, D)	\$ 24
Big Math Attack	(C) \$13 (D) \$19	TT#8 Character Graphics	\$ 19
Computation Concentration	(C) \$13 (D) \$19	TT#9 GTIA	\$ 19
Reading and Language Arts		TT#10 Sound Effects	
Wordmaster (D, C)	\$ 19	Pages 8	\$ 20
Spelling Genie (D, C)	\$ 19	The Next Step	\$ 27

Stocking Stuffers

WICO "BOSS" Joystick	\$ 15.00
WICO Redball Joystick	\$ 24.00
Elephant Diskette	\$ 18.00
Verbatim Diskette	\$ 24.00
Disk Savers (Plastic Sleeves) Multi Colored 1 Doz.	\$ 4.50
Disk Mailers	\$ 3.50
Flop 'n' File Diskette Holder w/Lock (holds 25)	\$ 18.50
Flop 'n' File Diskette Box (holds 50)	\$ 21.00
Library Carrying Case (holds 10)	\$ 2.50

Super Savers

Gorilla Banana Printer	\$ 209.00
Percom Single Density Drive	\$ 369.00
Percom Double Density Drive	\$ 515.00
Amdak Color II Monitor	\$ 299.00

Call Toll Free

1-800-634-6766

Order Line Only — Ask for Operator C058

Information & Order Inquiries (702) 369-5523

We accept VISA and MasterCard

Dealers' Inquiries Invited

New Hit List

In Search of the Most Amazing Thing	\$ 27
Witness	\$ 34
Cosmic Balance II	\$ 27
Temple of Apophis	\$ 27
Hyper Blaster	\$ 20
Deadline	\$ 34
Richochee	\$ 15
Wu & Phoenix	\$ 22
At Baba and the Forty Thieves	\$ 20
Canyon Climber	\$ 20
Crush, Chomble & Chomp	\$ 20
Zork I, II & III	\$ 27
Progger	\$ 23
Chop-It	\$ 23
Curse of Ra	\$ 15
Ulysses and the Golden Fleece	\$ 23
Tigers in the Snow	\$ 24
David & Midnight Magic (D)	\$ 23
Sky Blazer (D)	\$ 22
Seraphine (D)	\$ 22
Sea Fox (D)	\$ 20
Sands of Egypt (D)	\$ 27
Post 400 (CT)	\$ 27
Gort	(D) \$ 27 (CT) \$ 30
Wizard of Wor	(D) \$ 27 (CT) \$ 30
Cyborg (D)	\$ 23
Gold Rush (D)	\$ 23
Bandits (D)	\$ 23
Way Out (D)	\$ 27
Fast Rddy (CT)	\$ 24
World War (CT)	\$ 24
The Cosmic Balance (D)	\$ 27
Chess (D)	\$ 45
Chequer (D)	\$ 34
Raplan (D, C)	\$ 33
Submarine Commander (CT)	\$ 34
Junior Jet Pilot (CT)	\$ 34
Soccer (CT)	\$ 34
Starcross (D)	\$ 27
Zaxxon (D, C)	\$ 34
Minor 2048 (CT)	\$ 34
Twists (D)	\$ 23
Play Out (D)	\$ 24
The Bath of the Phoenix	\$ 16
Proctor II	(D) \$ 23 (CT) \$ 24
Baseball (CT)	\$ 34
Preppie II (D, C)	\$ 23
Arcade Machine (D)	\$ 38
Cal'n n' Cosmos (D)	\$ 26
Sp's Demise (D)	\$ 15
Region (D)	\$ 27
Critical Mass (D)	\$ 27
Millonaires (D)	\$ 65
Poker Sam (D)	\$ 17
Jump Man (D)	\$ 27
Halfway Warner (D, C)	\$ 27
Tion (D)	\$ 27
Adventure in Time (D)	\$ 23
Wary Nary (D)	\$ 20
Pharaoh (CT)	\$ 23
Pharaoh's Curse (D, CT)	\$ 23

Printers

NEC 8028A	\$ 439
Epson FX80	\$ 609
Epson FX300PT	\$ 799
Olivetti MU60A	\$ 419
Olivetti MU60A	\$ 569
Olivetti MU4AP	\$ 979
Olivetti 92	\$ 499
Olivetti 93	\$ 899
Clash 20 Printer	\$ 369
Minimaster Tally MT100L	\$ 599
Quam Split 11+	\$1049
Germis 10K	\$ 299
Germis 15	\$ 479

Monitors

Leading Edge Sonita Hi-Res 12"	\$ 65
Amdak Color I	\$ 299
Ulysses	\$ 149
NEC Green Screen	\$ 599

1095 E. Twain, Las Vegas, Nevada 89109 (702) 796-0296 • Mon. — Fri. 8 A.M. to 6 P.M. — Sat. 9 A.M. to 5 P.M.

ORDERING INFORMATION AND TERMS: For Fast Delivery and cashless checks, money orders or direct bank drafts are fastest. Personal and company checks allow 3 weeks to clear. Charges for C.O.D. orders are \$3.00 minimum or 1% for orders over \$300. Stocked purchase orders welcomed. Cash discount only and are subject to change without notice. Please enclose your phone number with any orders. SHIPPING — Software: \$2.50 minimum. SHIPPING — Hardware: Please call. SHIPPING — Foreign Orders: APO & FPO orders: \$10 minimum and 15% of all orders over \$100. Nevada residents add 5.34% sales tax. All goods are new and include factory warranty. Due to low prices, all sales are final. All returns must be accompanied by a return authorization number. Call 702-369-5523 to obtain one before returning goods for replacement.

DEC	HEX	BASIC	6502	ASCII	DEC	HEX	BASIC	6502	ASCII
128	80	END			192	C0	TAN	OPY #31	
129	81	FOR	STA (\$ZZ,X)	orange	193	C1	ATN	CMP (\$ZZ)	
130	82	NEXT			194	C2	PEEK		
131	83	DATA			195	C3	LEN		
132	84	INPUT#	STY \$ZZ		196	C4	STR\$	OPY \$ZZ	
133	85	INPUT	STA \$ZZ	F1	197	C5	VAL	CMP \$ZZ	
134	86	DIM	STX \$ZZ	F3	198	C6	ASC	DEC \$ZZ	
135	87	READ		F5	199	C7	CHR\$		
136	88	LET	DEY	F7	200	C8	LEFT\$	INX	
137	89	GOTO		F2	201	C9	RIGHT\$	CMP #51	
138	8A	RUN	TXA	F4	202	CA	MID\$	DEX	
139	8B	IF		F6	203	CB	GO		
140	8C	RESTORE	STY \$NNNN	F8	204	CC		OPY \$NNNN	
141	8D	GOSUB	STA \$NNNN	shift/voltage return	205	CD		CMP \$NNNN	
142	8E	RETURN	STX \$NNNN	uppercase	206	CE		DEC \$NNNN	
143	8F	REM			207	CF			
144	90	STOP	BOC \$NN	black	208	D0		8NE \$NN	
145	91	ON	STA (\$ZZ,Y)	clear up	209	D1		CMP (\$ZZ,Y)	
146	92	WAIT		reverse off	210	D2			
147	93	LOAD		cli/home	211	D3			
148	94	SAVE	STY \$ZZX	inside	212	D4			
149	95	VERIFY	STA \$ZZX	brown	213	D5		CMP \$ZZX	
150	96	DEF	STX \$ZZY	lt red	214	D6		DEC \$ZZX	
151	97	POKE		gray 1	215	D7			
152	98	PRINT#	TVA	gray 2	216	D8		CLD	
153	99	PRINT	STA \$NNNNY	lt green	217	D9		CMP \$NNNNY	
154	9A	CONT	TBS	lt blue	218	DA			
155	9B	LIST		gray 3	219	DB			
156	9C	CLR		purple	220	DC			
157	9D	CMD	STA \$NNNNX	ctrl left	221	DD		CMP \$NNNNX	
158	9E	SYS		yellow	222	DE		DEC \$NNNNX	
159	9F	OPEN		cyan	223	DF			
160	A0	CLOSE	LDY #51	space	224	E0		CPX #51	
161	A1	GET	LDA (\$ZZ,X)	█	225	E1		SBC (\$ZZX)	
162	A2	NEW	LDX #51	█	226	E2			
163	A3	TAB		█	227	E3			
164	A4	TO	LDY \$ZZ	█	228	E4		CPX \$ZZ	
165	A5	IN	LDA \$ZZ	█	229	E5		SBC \$ZZ	
166	A6	SPC	LDX \$ZZ	█	230	E6		INC \$ZZ	
167	A7	THEN		█	231	E7			
168	A8	NOT	TAY	█	232	E8		INX	
169	A9	STEP	LDA #51	█	233	E9		SBC #51	
170	AA	+	TAX	█	234	EA		NOP	
171	AB			█	235	EB			
172	AC	*	LDY \$NNNN	█	236	EC		CPX \$NNNN	
173	AD	/	LDA \$NNNN	█	237	ED		SBC \$NNNN	
174	AE	↑	LDX \$NNNN	█	238	EE		INC \$NNNN	
175	AF	AND		█	239	EF			
176	B0	OR	BCS \$NN	█	240	F0		BCS \$NN	
177	B1	,	LDA (\$ZZ,Y)	█	241	F1		SBC (\$ZZ,Y)	
178	B2	=		█	242	F2			
179	B3	<		█	243	F3			
180	B4	SGN	LDY \$ZZX	█	244	F4			
181	B5	INT	LDA \$ZZX	█	245	F5		SBC \$ZZX	
182	B6	ABS	LDX \$ZZY	█	246	F6		INC \$ZZX	
183	B7	USR		█	247	F7			
184	B8	FIX	CLV	█	248	F8		SED	
185	B9	POB	LDA \$NNNNY	█	249	F9		SBC \$NNNNY	
186	BA	SGR	TSX	█	250	FA			
187	BB	RND		█	251	FB			
188	BC	LOG	LDY \$NNNNX	█	252	FC			
189	BD	EXP	LDA \$NNNNX	█	253	FD		SBC \$NNNNX	
190	BE	COB	LDX \$NNNNY	█	254	FE		INC \$NNNNX	
191	BF	SIN		█	255	FF			

ASCII CODES: CODES 192-223 same as 96-127 CODES 224-254 same as 190-199 CODES 255 same as 125

There's a New Chick In Town



... with a wing load of Quality Software for the Commodore 64™ and VIC 20™

Once you've compared our programs, their features and prices, you'll agree there's no competition in sight. You'll also discover another important reason to go TOTL: Customer Assistance After You Buy. Something nearly unknown in the low cost software field.

some features

Menu driven, Easy to use ■ Available on tape or disk ■ Compatible With Most Column Expansion Hardware ■ Built-in ASCII Translation for Non Commodore Hardware ■ Color Variables for Easy Modification ■ Machine language speed for Word Processing and Mailing List & Label software.

and there are 5 unique programs to choose from

- 1. WORD PROCESSING** has the speed and versatility to produce documents, forms and letters in a straightforward approach that is easily and quickly learned.
- 2. MAILING LIST AND LABEL** lets you organize your mailing lists, collection catalogs, menus, recipes and anything that demands listing or sorting.
- 3. TOTL TIME MANAGER** helps you plan schedules and analyze events and activities by persons, project category and date. Ideal for project planning in the home or business.
- 4. RESEARCH ASSISTANT** turns your computer into an advanced, automated indexing and cross reference system. A must for the student, educator or the research professional.
- 5. SMALL BUSINESS ACCOUNTING** is a set of straightforward accounting programs. Frees the salesman, entrepreneur or service professional from time consuming record keeping tasks.



TOTL
SOFTWARE, INC.
quality you can afford

ask your dealer about TOTL software
or send us the coupon for further details
and ordering information

1555 East Avenue, Walnut Creek, CA 94596

PLEASE SEND ME MORE INFORMATION ON TOTL SOFTWARE

Name _____

Address _____

Zip _____

COMPUTE! Subscriber Services

Please help us serve you better. If you need to contact us for any of the reasons listed below, write to us at:

COMPUTE! Magazine
P.O. Box 5406
Greensboro, NC 27403

or call the Toll Free number listed below.

Change Of Address. Please allow us 6-8 weeks to effect the change, send your current mailing label along with your new address.

Renewal. Should you wish to renew your **COMPUTE!** subscription before we remind you, to send your current mailing label with payment or charge number or call the Toll Free number listed below.

New Subscription. A one year (12 month) US subscription to **COMPUTE!** is \$20.00 (2 years, \$36.00, 3 years, \$54.00. For subscription rates outside the US, see staff page). Send us your name and address or call the Toll Free number listed below.

Delivery Problems. If you receive duplicate issues of **COMPUTE!** if you experience late delivery or if you have problems with your subscription, please call the Toll Free number listed below.

COMPUTE!
800-334-0868
In NC 919-275-9809

VIC® 20 OWNERS



Fulfill the expansion needs of your computer with the

RAM-SLOT MACHINE

This versatile memory and slot expansion peripheral for the Commodore Vic-20 computer consists of a plug-in cartridge with up to 24Kbytes of low power CMOS RAM and 3 additional expansion slots for ROM, RAM and I/O. The cartridge also includes a reset button (eliminates using the power-on switch) and an auto start ROM selection switch.

ARSM-8K, 8K RAM + 3 slots \$ 84.50
ARSM-16K, 16K RAM + 3 slots \$ 99.50
ARSM-24K, 24K RAM + 3 slots \$119.50

We accept checks, money order, Visa/Mastercard, Add \$2.50 for shipping, an additional \$2.50 for COD. Michigan residents add 4% sales tax. Personal checks—allow 10 days to clear.

® Trademark of Commodore



K2 ELECTRONICS DESIGN CORPORATION
3990 Varsity Drive • Ann Arbor, MI 48104 • (313) 973-8266

It's time for your computer to grow up.

Meet PractiCalc.[™] The world's most versatile spreadsheet at only \$40.*

Games are fun when it's time to play. But at heart, your Commodore 64[™] or VIC-20[™] is a full-grown computer straining to gallop at the touch of your fingers.

But the problem is, most software's been designed for toys. Not for real computers. Until now.

Now comes PractiCalc. And there's not much in the world of grown-up computing it won't do. It'll keep addresses (in alphabetical or numerical order), phone numbers (likewise), make budgets and menus, project profits, keep track of expenses, inventories, investments, what have you. For your home, your school, your business.



Spreadsheet analysis... square roots, logarithms, exponential



Commodore 64 and VIC-20.
Not just for games...



Budgets, inventories, projections, you name it...

PractiCalc gives you everything you'd expect from a spreadsheet, like adding and subtracting, multiplying and dividing, calculating



numbers and even trig functions. And PractiCalc gives you a lot more.

Want to make a chart? Hit a key and the high or low resolution graphics of PractiCalc Plus or PractiCalc 64 will turn numbers into graphs. It'll even print out everything that shows on the screen.

Want a lot of facts and figures at your fingertips? PractiCalc stores more than 2,000 cells in up to 100 columns and 250 rows. It'll sort them, search them, or shuffle them for you.



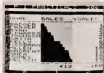
High-speed and wild card search...

All of which is a far cry from just playing with a joystick. Still, PractiCalc has one thing in common with a computer game. The price. Only \$40.



High or low resolution graphics...

You can add entries, delete them, or move them around—numerically or alphabetically, and instantly, of course. And you'll find PractiCalc unusually friendly, flexible, and forgiving.



Alpha or numeric sort...

PRACTICALC by  **COMPUTER SOFTWARE ASSOCIATES, INC.**

Exclusively distributed by **Micro Software International, Inc.**
The Silk Mill, 44 Oak Street, Newton Upper Falls, MA 02164 • (617) 527-7510

*\$40 is suggested retail price for tape version of PractiCalc-20 (\$45 for disk version, PractiCalc Plus or PractiCalc 64 - \$50 for tape version, \$55 for disk)

© 1983 Computer Software Associates, Inc. Commodore 64[™] and VIC-20[™] are trademarks of Commodore Business Machines, Inc.

VICTORY SOFTWARE

INTRODUCES

THE EARTH WARRIOR SERIES

METAMORPHOSIS \$19.95

You stumbled into the nest of the Cyclax and find yourself fighting off robot tanks guarding the Cyclax eggs. You think you have everything under control and then the eggs start hatching. Commodore 64 version features 4 different screens.

Available for COMMODORE 64 and VIC-20. Played with JOYSTICK.

CREATOR'S REVENGE \$19.95

The creator assembled a massive army of robots and insects to take revenge on the earth. Destroy insects, get treasures, and get the neutron bomb disactivator. Battle robots and destroy the neutron bomb before it annihilates your city Miss and you must face the mutants. Features 4 different screens.

Available for COMMODORE 64. Played with JOYSTICK.

LABYRINTH OF THE CREATOR \$19.95

Journey into the most complex and dangerous fortress ever built by the creator. You will encounter deadly robots, skulls, lakes, avalanches, false creators, and a creature who roams 256 rooms relentlessly pursuing you. Available for COMMODORE 64. Played with JOYSTICK.



Programs for the VIC-20 and the COMMODORE 64. All games available on TAPE or DISK and are packed full of MACHINE CODE.

BOUNTY HUNTER \$19.95

An adventure in the Old West. Journey back with us into the days of Jesse James and Billy the Kid where the only form of justice was a loaded revolver and a hangman's noose. In this full-length text adventure, you play the role of Bounty Hunter, battling against ruthless outlaws, hostile Indians, wild animals and the elements of the wilderness with only your wit and your six gun. Average solving time: 20-30 hours if you love adventures. This one is a real treat.

Available for COMMODORE 64 or the VIC-20 (with 8K or 16K expander). Played with KEYBOARD.

KONGO KONG \$19.95

Climb ladders, avoid the barrels the crazy ape is rattling off, and rescue the damsel. Commodore 64 version features 4 different screens! Available for COMMODORE 64. Played with JOYSTICK or KEYBOARD.

CAVE HOOPS \$14.95

Earth's surface is threatened by collapse from a strange group of creatures who bore out the earth's crust to make their dens. Your objective is to enter the creature's habitat and spin the invaders to death.

Available for COMMODORE 64. Played with JOYSTICK.



Check your local dealer or order directly ORDERING We accept personal checks, money orders, VISA, and MASTERCARD. Charge orders please include number and expiration date. Overseas orders please add charge or have check payable through a U.S. bank. Add \$1.50 postage and handling per order. IN. residents please add 6% sales tax.



VICTORY SOFTWARE INC.
7 Valley Brook Road, Patch, PA 15061
(215) 298-2787

64K

WE DON'T CLAIM ARCADE WE ARE ARCADE

KOOKY CLIMBER

As Alpine Joe, world famous mountain climber you must climb to the top of your apartment building. But watch out for Mr. Booboo and his trained attack duck, Walter.

An incredible mixture of sound and graphics makes this an all time favorite.

Hires sprites, extended real time music and Arcade quality graphics.

100% MACHINE CODE DISK **29.95**



POGO

- 100% MACHINE CODE
- ARCADE QUALITY GRAPHICS
- EXTENDED REAL TIME MUSIC
- EXCITING ANIMATED SPRITES

DISK **36.95**



SHOOTING GALLERY



- 100% MACHINE CODE
- REAL TIME MUSIC
- COLORFUL SCROLLING GRAPHICS
- GOOD PLAYABILITY

CASSETTE DISK **27.95**

STAR SLAYER



Sent on a mission, you must destroy all the enemy base stations. But your task won't be easy, they have their best fighter pilots on your tail and they are hard to shake.

—And don't forget about asteroids — they are just as dangerous.

Never before has there been such realism and excitement in one game. STARSAYER brings you and your 64 into real-time space combat.

DISK **36.95**

100% MACHINE LANGUAGE

**WE ARE
RENDSOFT
SOFTWARE
SYSTEMS**

SPECIFY CASSETTE OR DISK
N.Y. RESIDENTS PLEASE ADD 7% SALES TAX
PLEASE ADD \$3.00 SHIPPING AND HANDLING
PAID (CHECK OR MONEY ORDER) OR C.O.D. ONLY

P.O. Box 170 Coram
New York 11277

Contact Your Local Dealer.

Or Send Check or Money Order For the Total

(516) 732-5190

SOFTWARE AUTHORS WANTED
DEALER INQUIRIES INVITED

DESTRUCTION
AND
DEALER
INQUIRIES
INVITED

Atari GTIA Textwriter

Matthew Ratcliff

Here is a utility that will put text on your Atari graphics screens 3-11. It was designed specifically for modes 9-11, thus the name "GTIA Textwriter." If you have tried the GTIA demos published in earlier issues of COMPUTE!, you know what superb displays can be generated in these modes.

"Textwriter" gives you 15 colors of text in mode 11, 15 shades of the same color in mode 9, and 8 different color-shade combinations in mode 10. CTIA users, don't despair; this routine will put solid-colored text on the screen in modes 3-8 as well. You can even get two-color characters in modes 3, 5, and 7. Also included is "Color Type," a fast-action typing game. But first, an explanation of Textwriter.

Until now, the only way to get text on the GTIA screens was through Display List Interrupts (DLIs) or slow PLOT, DRAWTO combinations. "Textplot" and "Textplot II" (COMPUTE!, November 1981 and December 1982) will work with a custom character set, but they limit the number of colors allowed to three. The characters will have to be generated according to Figure 1 or 2 (both for up to six colors of text - but characters will have to be duplicated). Every other column must be empty or identical to the one before to prevent the unreadable multicolored text that results when using Textplot with the standard character set. This approach might be sufficient for some needs, but I wanted something that would take full advantage of the color capabilities of the GTIA graphics modes 9-11.

Figure 1



Figure 2



vantage of the 16 possible colors in these modes. The result is a flexible USR routine called GTIA Textwriter.

This program is a fully position-independent machine language routine. Using Atari's "auto return" mode, Program 1 converts the DATA statements in lines 10000 through 10400 into a series of AS string equates (they become lines 11 through 17). When run, it will create these new program lines and stop after printing the following:

```
LPRINT
LIST "C",10,18
```

Use the cursor control keys and RETURN to execute these two commands (LPRINT makes the tape output more reliable). This is the complete GTIA Textwriter program, all 410 bytes of it. Be sure to save the BASIC source code before trying Textwriter, in case you have to go back for a little debugging. Line 18 shows the general command format:

```
18 REM A=USR (AD,BD,COLOR,LEN(B%),ROW
,COL) ** AD=ADR(A%) * BD=ADR(B%)
**
```

To check out Textwriter, try NEW, ENTER "C:" the listed code, and add the following lines:

```
20 GRAPHICS 11:COLOR 1:PLOT 0,0:DRAW
TO 79,191:C=1
30 A=USR (AD,ADR("TEST"),C,4,90,24)
40 C=C+1:IF C>15 THEN C=1
50 GOTO 30
```

This program will draw a diagonal line across the screen and then flash "TEST" near the center of the screen. If all goes well, you are ready to proceed. If not, go back to the source and track down the problem in the DATA.

Color And Text Variations

Now that you have Textwriter running, let's learn a little about how to take advantage of some of its features. First of all, Textwriter is a very USR friendly routine. It has a flexible calling format to save time and effort in coding. If too much infor-

mation is given to Textwriter, it executes what it needs, cleans up the stack (ignoring the extra), and returns safely to BASIC. When parameters are left off, certain default conditions are set by the routine. Below is a table showing all the valid calls for Textwriter and the associated default conditions.

Valid Calls And Default Conditions

1. **A = USR(AD,ADR("TEXT"),COLOR,4,Y,X)**
General calling format, no defaults.
2. **A = USR(AD,BD,COLOR,LEN(BD),Y)**
No X, then left justified (X=0).
3. **A = USR(AD,ADR("PLOT"),COLOR,4)**
No Y or X, then placed at first character position following current graphics cursor position (set by PLOT DRAWTO, etc.).
4. **A = USR(AD,ADR("T"),COLOR)**
No X, Y, or length specified. The current graphics cursor position is defaulted and a length of 1 is used.
5. **A = USR(AD,ADR("A"))**
No X, Y, length, or color. All the #4 defaults are used, and the last color set by the BASIC COLOR command is used.

The only invalid call to Textwriter is **A = USR(AD)**. With no string address it can do little, so it will ring the console buzzer (like Textplot) and return safely to BASIC.

To get three colors of text in modes 3, 5, and 7, use colors 5, 10, and 15. Other color choices will give interesting characters with blank or colored vertical bands through them. The most interesting are colors 6 and 9, which give two-color text. These colors can be changed with SET-COLOR registers 0 and 1. The color band sequence for 6 is the complement of 9, which can be used to make the text appear animated. For example:

```
20 GRAPHICS 21:SETCOLOR 1,5,10:SETCOLOR 0,9,0
30 A=USR(AD,ADR("AB"),6,1):FOR J=1 TO 50:NEXT J
40 A=USR(AD,ADR("AB"),9,1):FOR J=1 TO 50:NEXT J:GOTO 30
```

Use color 15 to get solid text in modes 4, 6, and 8. In mode 8, color 5 results in blue text, and 10 in red text, through artifacting (this is seen best on a black background, GRAPHICS 8:POKE 710,0). If you have Textplot and/or Textplot II in your program library, you will be happy to know that GTIA Textwriter is quite compatible with either of them, since all of Textwriter's workspace is floating point RAM on page zero, which is free for USR routines. These routines can work together to put two different sizes of text on the same screen without having to go to DLIs.

Typing Practice Game

The Color Type game (Program 3) uses GTIA Textwriter and another USR routine. This USR routine and the game's music data will be loaded

into strings with Program 2. Run Program 2, creating lines 1-9, ENTER "C:" Textwriter and then LIST "C:",1,18. This code can then be ENTERED into RAM so that you can begin typing in Program 3. The USR routine loaded with Program 2 is a clear screen utility put in CL55. The screen will blank with random color pixels rather than the basic black you get with a GRAPHICS 11 command. The CL55 USR routine is called after each word is typed successfully on the screen, since the word destroys part of the background as it is displayed.

Color Type is a touch-typing practice game. It has lots of colors (using GTIA graphics mode 11), sound, and two complete songs. The introductory song played with the title page should be interesting, though not perfect. The second song sounds quite nice, since it is played completely in minor chords (line numbers for DATA in lines 935 through 981 are very important). You must be a pretty good typist to get to this musical part of the game, as you will see.

Press any key to leave the title page and begin typing. Color Type restores to a random line number and reads the sentence stored there, one word or short phrase at a time. The words are put at or near the top of the screen and begin to drift toward the bottom. You must type the word correctly before it gets that far and blows you up, thus ending the game. One wrong key and you have to retype the entire word. After each sentence is typed, the difficulty factor increases and the next sentence appears a little lower on the screen.

After five complete sentences (this factor will vary as difficulty increases), your current score and words per minute (WPM) for that set of sentences (SET) will be displayed. Press the space bar to continue typing or the Q key to quit and see a summary of your typing performance, including:

- 1) Average WPM
- 2) Best WPM set
- 3) Total characters typed
- 4) Total typo errors
- 5) Final score

By continuing after each SET, you may reach several bonuses. Once the difficulty is increased to the point where the words originate below the center of the screen, you will get a bonus at the end of the current SET. If you type through six bonus SETs successfully, you will get an extra bonus of 1000 points and hear the second song mentioned above. At an average typing speed of 40 WPM, it takes about 15 minutes to get this far in the game - a good practice session. If you decide to continue, the game play loop will start over with the minimum difficulty. My guess is that an average typing speed of 30-35 WPM is required to ever get this far. If you are a beginner and would

like to hear the music more often, replace line 620 with the following:

```
620 DIF=2*TX:1F DIF>60 THEN TX=0:DIF
    =1:GOSUB 840
```

This will give you an extra bonus after every three bonus SETs. If you are a real pro, change the IF statement to DIF>160.

Color Type is fast enough to allow typing speeds of up to 70 WPM. It will not run any faster due to software overhead. I've gotten up to 64 WPM by practicing the same line repeatedly (only 38 WPM on the 400 membrane keyboard). Feel free to customize Program 3 by changing the DATA statements beginning at line 1000 (line increment of 1). Each sentence must begin with a number equal to the total number of words or short phrases in the sentence, followed by the word list, with commas separating the words. For example:

```
1009 DATA 3,THIS,IS,A,TEXT
```

Upper- and lowercase may be used in the data as well. Some punctuation may be added, like a period at the end of the sentences. Even inverse video or control characters may be used (but this might make the game just a *bit* difficult). If more data is added, the LINES equate at line 220 must be updated accordingly. Note that word length is limited to only nine characters; with more than nine, wraparound will occur.

This program is also good for memorization and spelling practice. If you need to memorize something, arrange the DATA sentences in the proper sequence and add the following line:

```
201 LNO=0
```

Then replace line 250 with:

```
250 LNO=LNO+1:1F LNO>LINES THEN LNO=
    0:RESTORE 1000
```

Program 1: GTIA Textwriter

```
5 GRAPHICS 0:?"CONVERTING...11"
10 DIM A$(410),B$(25):AD=ADR(A$):BD=
    ADR(B$)
18 REM A=ADDR(AD,BD,COLOR,LEN(B$),ROW,
    COL):*AD=ADR(A$):*BD=ADR(B$):*
19 NA=0:L=1:RESTORE
20 FOR I=1 TO 410
30 READ A:A$(I,1)=CHR$(A)
40 IF INT(1/60)=1/60 AND 1>59 OR 1=4
    18 THEN LA=NA+1:NA=1:GOSUB 700
50 NEXT I
60 ? "LPRINT":? :? :? "LIST ";CHR$(3
    4):?"C: ";CHR$(34):",10,18":STOP
700 T=PEEK(709):POKE 709,PEEK(710):?
    CHR$(125)
710 POSITION PEEK(82),2:?" I? L: " A$(
    "LA:","NA:"):?"CHR$(34):
715 FOR K=LA TO NA:?"CHR$(27):A$(K,K
    ):NEXT K
720 ? CHR$(34)
730 ? "CONT"
```

```
740 POSITION PEEK(82),0:POKE 842,13:
    STOP
```

```
750 POKE 842,12:L=L+1:?"CHR$(125):"C
    ONVERTING...":L:POKE 709,T:RETUR
    N
```

```
10000 DATA 165,200,133,223,169,1,133,
    222,165,84
```

```
10010 DATA 133,229,165,85,133,227,16
    5,86,133,228
```

```
10020 DATA 166,87,169,10,224,5,144,8
    169,20
```

```
10030 DATA 224,7,144,2,169,40,133,23
    9,104,240
```

```
10040 DATA 40,170,104,133,213,104,13
    3,212,202,240
```

```
10050 DATA 49,104,104,133,223,202,24
    0,42,104,104
```

```
10060 DATA 133,222,202,240,35,104,10
    4,133,229,202
```

```
10070 DATA 240,22,104,133,220,104,13
    3,227,202,240
```

```
10080 DATA 19,104,104,202,200,251,24
    144,11,169
```

```
10090 DATA 253,76,164,246,169,0,133,
    227,133,228
```

```
10100 DATA 165,229,133,233,165,239,1
    33,236,169,0
```

```
10110 DATA 133,230,162,8,10,30,230,6
    233,144
```

```
10120 DATA 7,24,101,236,144,2,230,23
    0,202,200
```

```
10130 DATA 239,133,229,165,80,133,21
    6,165,89,133
```

```
10140 DATA 217,165,229,24,101,216,13
    3,216,165,230
```

```
10150 DATA 101,217,133,217,162,1,165
    87,201,9
```

```
10160 DATA 176,7,162,2,74,176,2,162,
    3,165
```

```
10170 DATA 227,101,220,240,25,70,228
    102,227,202
```

```
10180 DATA 240,5,70,227,202,200,251,
    230,227,24
```

```
10190 DATA 165,227,101,216,133,216,1
    44,2,230,217
```

```
10200 DATA 165,216,133,224,165,217,1
    33,225,169,0
```

```
10210 DATA 133,226,162,0,169,0,149,2
    10,232,165
```

```
10220 DATA 223,149,218,10,10,10,10,2
    32,149,218
```

```
10230 DATA 5,219,232,149,218,164,226
    177,212,162
```

```
10240 DATA 0,134,234,201,128,144,4,4
    1,127,190
```

```
10250 DATA 234,170,133,236,224,96,17
    6,13,169,64
```

```
10260 DATA 224,32,144,2,169,224,24,1
    01,236,133
```

```
10270 DATA 236,169,8,133,233,169,0,1
    33,215,162
```

```
10280 DATA 8,10,30,215,6,233,144,7,2
    4,101
```

```
10290 DATA 236,144,2,230,215,202,200
    239,133,214
```

```
10300 DATA 24,173,244,2,101,215,133,
    215,160,0
```

```
10310 DATA 132,235,160,8,132,238,24,
    144,3,24
```

```
10320 DATA 144,169,164,235,177,214,2
    30,235,69,234
```

```
10330 DATA 133,232,169,0,133,237,169
```

COMPUTE!'s First Book Of Atari Graphics

Authors: COMPUTE! Magazine
editors and contributors
Price: \$12.95
On Sale: Now

COMPUTE!, the leading magazine of home, educational, and recreational computing, has led the way for Atari owners since the computers were first introduced in 1979. **COMPUTE!** has published scores of articles on Atari graphics, and was the first to divulge many important details on such techniques as redefined characters, custom graphics modes, and player/missile graphics. But those articles are scattered across dozens of issues, many of which are scarce or out of print.

That's why the editors of **COMPUTE!** decided to gather the very best Atari graphics articles published over the past three years into **COMPUTE!'s First Book Of Atari Graphics**. From the fundamentals to advanced techniques, here are some of the most instructive articles ever published for the Atari.

But that's not all. **COMPUTE!'s First Book Of Atari Graphics** also presents articles never before published anywhere, and additional sections written especially for this book. These include "The Basics Of Atari Graphics," an introductory tutorial which prepares beginners for the rest of the book; "How To Design Custom Graphics Modes," which covers the fundamentals of mixing modes on a single screen, and "Introduction To Player/Missile Graphics," a guide to understanding one of the Atari's most advanced features, written by Bill Wilkinson, a **COMPUTE!** columnist and a creator of Atari BASIC and the Atari Disk Operating System.

Numerous other articles include "Designing Your Own Character Sets," a new and improved "SuperFont," "High Speed Animation With Character Graphics," "Animation And Player/Missile Graphics," "The Collision Registers," and "GRAPHICS 8 In Four Colors Using Artifacts." There's even a brand new article by Wilkinson, "The Priority Registers," which for the first time shows how to use player/missile graphics to create a fifth player.

In the **COMPUTE!** tradition, **Atari Graphics** is crisply written and edited to be useful to beginners and experts alike. And it's spiral-bound for easy access to its dozens of ready-to-type program listings.

Available at computer dealers and bookstores nationwide. To order directly call TOLL FREE 800-334-0868. In North Carolina call 919-275-9809. Or send check or money order to **COMPUTE! Books**, P.O. Box 5406, Greensboro, NC 27403.

Add \$2 shipping and handling. Outside the U.S. add \$5 for air mail, \$2 for surface mail. All orders prepaid, U.S. funds only.

V. Introduction Robert C. Lock

1 Chapter One: Fundamentals Of Atari Graphics

- 3 The Basics Of Atari Graphics Tom R. Halfhill
- 16 Using Strings For Graphics Storage Michael Boom
- 20 Using The COLOR And LOCATE Instructions To Program Pong-Type Games Michael A. Greenspan

23 Chapter Two: Customizing The Graphics Modes

- 25 How To Design Custom Graphics Modes Craig Chamberlain
- 37 Put Graphics Modes 1 And 2 At The Bottom Of Your Screen R. Alan Belke
- 41 Printing Characters In Mixed Graphics Modes Craig Patchett
- 44 Add A Text Window To GRAPHICS 0 Charles Brannon
- 46 Mixing Graphics Modes 0 And 8 Douglas Crockford

51 Chapter Three: Redefining Character Sets

- 53 Designing Your Own Character Sets Craig Patchett
- 62 SuperFont Charles Brannon
- 77 Character Set Utilities Fred Pinho

89 Chapter Four: Animation With Character Graphics

- 91 TextPlot Charles Brannon
- 98 Using TextPlot For Animated Games David Plotkin
- 108 High-Speed Animation With Character Graphics Charles Brannon

127 Chapter Five: Animation With Player/Missile Graphics

- 129 Introduction To Player/Missile Graphics Bill Wilkinson
- 140 A Self-Modifying P/M Graphics Utility Adding High-Speed Vertical Positioning To P/M Graphics Kenneth Grace, Jr.
- 154 P/M Graphics Made Easy David H. Markley
- 164 Animation And P/M Graphics Tom Sak and Sid Meier
- 172 Extending Player/Missile Graphics Tom Sak and Sid Meier
- 184 The Collision Registers Eric Stoltman
- 192 The Priority Registers Matt Givier

201 Chapter Six: Advanced Graphics Techniques

- 203 GRAPHICS 8 In Four Colors Using Artifacts David Diamond
- 208 Atari Video Graphics And The New GTIA, Part 1 Craig Chamberlain
- 215 Atari Video Graphics And The New GTIA, Part 2 Craig Chamberlain
- 224 Atari Video Graphics And The New GTIA, Part 3 Craig Chamberlain
- 236 Protecting Memory For P/M And Character Sets Fred Pinho
- 239 Screen Save Routine Joseph Trem
- 245 Listing Conventions (Guide To Typing In Programs)
- 246 Index

```

,4,133,231
10340 DATA 167,0,133,233,160,2,6,232
,38,233
10350 DATA 136,200,249,166,233,181,2
18,164,237,145
10360 DATA 216,250,237,198,231,200,2
29,24,165,216
10370 DATA 101,239,133,216,144,2,230
,217,198,238
10380 DATA 200,196,198,222,200,1,96,
230,226,24
10390 DATA 165,224,105,4,133,224,144
,2,230,225
10400 DATA 133,216,165,225,133,217,2
4,144,166,96

```

Program 2: Music Data Loader For Color Type

```

100 DIM CLS$(33),SONG$(124),TUNE$(37
6):GRAPHICS 0:?"WORKING ON IT..
"
110 RESTORE 10000
120 FOR I=1 TO 37:READ A
130 CLS$(I,1)=CHR$(A):NEXT I
140 FOR I=1 TO 124 STEP 2
150 READ C,N
160 SONG$(I,1)=CHR$(C):SONG$(I+1,I+1
)=CHR$(N):NEXT I
200 ? CHR$(125):POSITION PEEK(82),2:
? I:?"1 DIM CLS$(33),SONG$(124),
TUNE$(376):CLS$="":CHR$(34):
210 FOR I=1 TO LEN(CLS$):? CHR$(27):
CLS$(I,1):NEXT I:?"CHR$(34)
220 GOSUB 500:REM ENTER IT
230 ? CHR$(125):POSITION PEEK(82),2:
?:?"2 SONG$(1,62)=":CHR$(34):
240 FOR I=1 TO 62:?"CHR$(27):SONG$(I
,1):NEXT I:?"CHR$(34)
250 GOSUB 500
260 ? CHR$(125):POSITION PEEK(82),2:
?:?"3 SONG$(63,124)=":CHR$(34):
270 FOR I=63 TO 124:?"CHR$(27):SONG$(
I,1):NEXT I:?"CHR$(34)
280 GOSUB 500
290 RESTORE 6000
300 FOR I=1 TO 376:READ C:TUNE$(I,I)
=CHR$(C):SOUND 0,C,10,3:NEXT I
310 D=1
320 FOR I=1 TO 5:?"CHR$(125):POSITIO
N PEEK(82),2:?"1-3:"TUNE$(I,D):
,":D=D+1:?"":CHR$(34):
330 FOR J=D TO D+61:?"CHR$(27):TUNE$(
J,J):NEXT J
340 ? CHR$(34):GOSUB 500
350 D=D+62:NEXT I
360 ? CHR$(125):POSITION PEEK(82),2:
?:?"9 TUNE$(311,376)=":CHR$(34):
370 FOR I=311 TO 376:?"CHR$(27):TUNE
$(I,1):NEXT I
380 ? CHR$(34):GOSUB 500
390 ? CHR$(125):LIST 1,9
400 ? I:?"LPRINT":?"I:?"LIST":?"CH
R$(34):?"C":?"CHR$(34):?"1,9":END
500 ? "CONT"
510 POSITION PEEK(82),0:POKE 842,13:
STOP
520 POKE 842,12
530 RETURN
6000 DATA 5,162,5,162,5,162,5,162,10
,128,10,128,5,100,5,100,5,100,5
,100,10,96,10,81,10,121,10,121,
10,96,5,96
6010 DATA 10,81,5,96,10,81,5,72,5,81

```

```

,10,96,10,81,10,96,10,81,10,96,
10,96,5,100,10,96,5,85,30,100,2
5,100
6020 DATA 40,100,5,162,10,162,5,162,
5,120,5,120,5,128,5,128,10,100,
10,100,10,96,10,81
6030 DATA 5,121,10,121,5,121,10,96,5
,96,10,81,5,96,10,81,5,72,5,81,
5,81,15,64,10,72,10,81,5,100,5,
96
6040 DATA 10,100,10,120,10,120,10,12
8,20,162,40,100,10,96,10,81,10,
60,15,72,30,81
6050 DATA 10,96,10,81,10,81,5,96,10,
81,5,96,10,72,10,72,10,64,10,96
,10,81
6060 DATA 10,100,15,64,15,72,10,81,1
10,96,5,96,15,81,10,81,10,81,5,
96,10,81,15,81,10,81,10,72,10,6
4,10,96,10,81
6070 DATA 10,100,15,60,15,72,10,81,1
0,96,10,96,10,81,10,81,5,96,15,
81,10,72,10,64,10,96,10,81
6080 DATA 20,72,10,72,20,72,110,72,1
0,96,10,64,10,100,10,47,5,64,15
,53,10,64,10,53,10,64,20,100
6100 DATA 10,60,15,72,30,81,10,100,1
0,96,10,81,5,96,10,81,5,96,10,5
,81,10,72,10,64,10,96,10,81,10,1
00,15,64,10,100
6110 DATA 15,72,110,81,10,96,5,96,15
,81,10,81,10,81,5,96,15,81,15,8
1,10,81,10,72,10,64,10,96,10,81
6120 DATA 10,100,15,60,15,72,110,81,
10,96,10,96,10,81,10,81,5,96,15
,81,10,81,10,72,10,64,10,96,10,
81
6130 DATA 20,72,10,72,20,72,110,72,1
0,96,10,64,10,53,10,47,5,64,15,
53,10,64,10,53,10,64,20,100
10000 DATA 104,165,88,133,214,165,89
,133,215,169
10010 DATA 30,133,216,160,0,173,10,2
10,9,17
10020 DATA 145,214,230,214,200,245,2
30,215,198,216
10030 DATA 200,239,96
10040 DATA 15,40,5,40,5,35,5,40,5,47
10050 DATA 5,60,20,60,20,72,15,81,5,
60
10060 DATA 5,47,5,60,5,40,5,47,40,53
10070 DATA 15,40,5,40,5,35,5,40,5,47
10080 DATA 5,60,20,60,20,72,15,81,5,
60
10090 DATA 5,47,5,53,5,60,5,64,30,60
10100 DATA 10,100,15,53,5,57,5,53,5,
47
10110 DATA 5,45,5,53,20,47,20,40,15,
35
10120 DATA 5,35,5,40,5,47,5,45,5,47
10130 DATA 40,53,15,40,5,40,5,35,5,4
0
10140 DATA 5,47,5,60,20,60,20,72,15,
81
10150 DATA 5,60,5,47,5,53,5,60,5,64
10160 DATA 40,60,40,100

```

Program 3: Color Type

```

20 S0=53760:S1=S0+2:GOSUB 5000:GOTO
200
30 MINUTES=(PEEK(20)+256*PEEK(19)+65
536*PEEK(18))/3600:RETURN

```

```

40 POKE 18,0:POKE 19,0:POKE 20,0:RET
URN
200 DIM WORD$(10),BL$(10):DPEN #1,4,
0,"K":RD=53770:BL$="(10 SPACES)"
:BL=ADR(BL$):TX=0:CHARCNT=0:CLS=
ADR(CLS)
210 GDSUB 40
220 LINES=9:REM TOTAL # OF LINES DEF
INED IN DATA
230 GRAPHICS 11:DIF=0:CC=1:SC=0:S0=5
3760:TTLNS=0:TCHAR=0:TERR=0
240 TTLNS=TTLNS+1:TRAP 250:SDUND 0,0
,10,6
250 LNO=INT(RND(I)*LINES)+1000:RESTD
RE LNO
260 READ WORDS:TRAP 40000
270 FOR I=1 TO WORDS:READ WORD$:LB=0
:B$="":WW=LEN(WORD$):XP=INT((80-
8*WW)/2)-8:XP=XP*(XP>0):CHARCNT=
CHARCNT+WW
280 A=USR(CLS)
290 FOR Y=DIF TO 175
300 CC=CC+1:IF CC>15 THEN CC=1
310 A=USR(AD,ADR(WORD$),CC,WW,Y,XP):
POKE S0,Y:IF (PEEK(764)=255) THE
N 300
320 GET #1,K:LB=LB+1:B$(LB,LB)=CHR$(
K)
330 O=LB-1:A=USR(AD,BD+O,CC,1,180,8*
O+XP)
340 ON B$=WORD$ GOTO 430
350 DN (B$(LB,LB)=WORDS(LB,LB)) GOTO
380
360 FOR D=15 TO 0 STEP -.5:SDUND 0,
200,8,D:NEXT D:SDUND 0,Y,10,6:PO
KE 764,255:A=USR(AD,BL,1,LB,183,
XF):LB=0
370 SC=SC-WW:B$="":TERR=TERR+1
380 NEXT Y
390 A=USR(AD,ADR(" CRASH ")),6,9,80
)
400 A=175:FOR D=15 TO 0 STEP -.2:PL
OT XP,A:DRAWO B*WW+XP+1,A:IF IN
T(D)=0 THEN A=A-1:CDLOR 0
410 SOUND 0,PEEK(RD),8,D:NEXT D:SC=S
C-WW:SDUND 0,0,0,0:POKE 764,255
420 CDLDR 0:FOR D=175 TO 191:PLDT XP
,D:DRAWDT B*WW+XP+1,D:NEXT D:CHAR
AR=TCHAR+CHARCNT:GOTO 740
430 SC=SC+WW:POKE S0,60
440 NEXT I:GOSUB 30
450 DIF=DIF+.6:IF DIF=143 THEN 400
470 IF TTLNS<5 THEN GOTO 240
480 TTLNS=0
490 GRAPHICS 11:B$=STR$(SC)
500 A=USR(AD,ADR(" SCORE ")),5,9,18
):I=INT((10-(LEN(B$)/2)+5)*8:IF I
<0 THEN I=0
510 A=USR(AD,BD,3,LEN(B$),40,I):POKE
764,255
520 FOR I=0 TO 74 STEP 2:CDLOR INT(1
4*RND(I))+1
530 PLOT I,0:PLOT I,190:POKE S0,PEEK
(RD)
540 PLOT I,1:PLOT I,189:NEXT I
550 FOR I=0 TO 109 STEP 5:COLDR INT(
RND(I)*14)+1
560 PLOT 0,1:PLOT 74,I+1:PLOT 0,I+1:
PLOT 74,I+1:PLOT 0,I+2:PLOT 74,I
+2
570 POKE S0,PEEK(RD):NEXT I
580 FOR I=15 TO 0 STEP -.1:SOUND 0,
120,12,I:NEXT I
590 IF DIF<143 THEN GOTO 450
600 A=USR(AD,ADR("BONUS"),7,5,64,16)
:TX=TX+10:D=100*(TX/10):SC=SC+0:
B$=STR$(D)
610 A=USR(AD,BD,9,LEN(B$),80,24)
620 DIF=TX*2:IF DIF>100 THEN TX=0:D
I=1:GOSUB 840
630 FOR I=1 TO 50:A=240*RND(0):FOR D
=0 TO 15 STEP 5:SDUND 0,A,10,0:S
OUND 1,A+5,16,D:NEXT D:NEXT I
640 SDUND 0,0,0,0:SDUND 1,0,0,0
650 REM CURRENT WPM
660 POKE 764,255
670 WPM=INT((CHARCNT/5)/MINUTES):TWP
M=TWPM+WPM:TSETS=TSETS+1:TCHAR=T
CHAR+CHARCNT:CHARCNT=0
680 B$=STR$(WPM):IF WPM<BWPM THEN BW
PM=WPM
690 A=USR(AD,ADR(" WPM ")),CC,7,140
,8):CC=CC+1:IF CC>15 THEN CC=1
700 A=USR(AD,BD,CC,LEN(B$),156,24):C
C=CC+1:IF CC>15 THEN CC=1
710 IF PEEK(764)=255 THEN 690
720 GET #1,K:IF CHR$(K)="0" THEN GOT
O 740
730 GRAPHICS 11:GDSUB 40:GOTO 240
740 GRAPHICS 0:PDSITIDN 2,2:IF TSETS
=0 THEN TSETS=1
750 ? "AVERAGE WORDS PER MINUTE = ":
INT(TWPM/TSETS)
760 PDSITION 10,4:?"BEST WPM = ",BW
PM
770 POSITION 2,6:?"TDOTAL CHARACTERS
TYPED = ",TCHAR
780 POSITION 6,8:?"TDOTAL TYPO ERRDR
S = ",TERR:POSITION 8,10:?"FINA
L SCORE = ",SC
790 POSITION 7,14:?"(S)TDP OR (R)EP
LAY ":
800 SETCOLDR 2,CC,3:CC=CC+1:IF CC>15
THEN CC=1
810 IF PEEK(764)=255 THEN 800
820 GET #1,A:IF CHR$(A)="S" THEN GRA
PHICS 0:END
830 RUN
840 REM SONG ROUTINE TO GIVE A REST
850 S=ADR(SONG):L=LEN(SONG):REM TO
THE WEARY TYPIST
860 FOR I=S TO S+L-1 STEP 2
870 C=PEEK(I):N1=PEEK(I+1):IF N1=100
THEN 890
880 RESTORE 900+N1:READ N2,N3,N4
882 SOUND 0,N1,10,10:SOUND 1,N2,10,8
:SDUND 2,N3,10,6:SDUND 3,N4,10,5
890 FOR DELA=1 TO 6*C:NEXT DELA:FOR
G=0 TO 3:SDUND 6,0,0,0:NEXT G:NE
XT I
900 SC=SC+1000:A=USR(AD,ADR("1000"),
12,4,72,24):RETURN
935 DATA 42,52,70
940 DATA 47,60,81
945 DATA 54,67,90
947 DATA 56,70,94
953 DATA 63,79,106
957 DATA 68,85,114
960 DATA 71,90,120
964 DATA 76,96,128
972 DATA 85,108,144
981 DATA 96,121,162
1000 DATA 16,NOW,IS,THE,TIME,FOR,ALL
,GOOD,MEN,TO,COME,TO,THE,AID,OF
,THEIR,COUNTRY
1001 DATA 5,MARY,HAD,A,LITTLE,LAMB

```

```

1002 DATA 4,TIRED,FINGERS,TYPE,SLOWL
Y
1003 DATA 9,THE,RAIN,IN,SPAIN,FALLS,
MAINLY,ON,THE,PLAIN
1004 DATA 6,TYPING,IS,GOOD,FOR,THE,F
INGERS
1005 DATA 5,I,EAT,BANANAS,FOR,LUNCH
1006 DATA 7,TOUCH,TYPING,IS A,TRUE,T
EST,OF,SKILL
1007 DATA 5,VIDEO,GAMES,ARE,GREAT,FU
N
1008 DATA 6,WE,SAW A,ZEBRA,AT,THE,20
0
5000 REM TITLE PAGE
5010 GRAPHICS 11
5020 B$="COLOR":CC=1:Y=24
5030 FOR I=0 TO LEN(B$)-1
5040 A=USR(AD,BD+I,CC,1,Y,8*I+16)
5050 CC=CC+1:IF Y=24 THEN Y=28:GOTO
5070
5060 Y=24
5070 NEXT I
5080 B$="TYPE":Y=40
5090 FOR I=0 TO LEN(B$)-1
5100 A=USR(AD,BD+I,CC,1,Y,8*I+16)
5110 CC=CC+1:IF CC>15 THEN CC=1
5120 IF Y=40 THEN Y=52:GOTO 5140
5130 Y=48
5140 NEXT I
5150 A=USR(AD,ADR(" BY "),9,4,66,16)
5160 T=ADR(TUNE$):SOUND 0,0,10,8:SOU
ND 1,0,10,6
5170 A=USR(AD,ADR("PRESS ANY"),3,9,1
48,0):A=USR(AD,ADR("KEY"),4,3,1
64,24):COLOR 0:PLOT 8,124

```

```

5180 FOR I=T TO T+LEN(TUNE$)-1 STEP
2
5190 C=PEEK(I):N=PEEK(I+1):F=0
5200 IF C>100 THEN C=C-100:F=1
5210 IF N=100 THEN GOTO 5230
5220 POKE 90,N:POKE 81,N+1
5230 A=USR(AD,ADR("HAT RAT"),CC,7):C
C=CC+1:IF CC>15 THEN CC=1
5240 FOR A=1 TO 1.24:NEXT A
5250 IF NOT (F) THEN POKE 90,0:POKE
81,0
5260 IF PEEK(764)<255 THEN 5280
5270 NEXT I:GOTO 5180
5280 POKE 764,255:SOUND 0,0,0,0:SOUN
D 1,0,0,0
5290 RETURN

```

16K ATARI CASSETTE Lose, Clip, And Sort No More!

LIST IT
A REAL DATA BASE
POWERFUL & VERSATILE
STORE•FORMAT TEXT
PRINT•CROSS REFERENCE
COUNT LABELS & LISTS
BOTH EDIT, ADD, DELETE, AND ARE MENU DRIVEN!

FROM SCRATCH
RECIPE FILING SYSTEM
FIND BY INGREDIENT OR OISH
CONVERT YIELD INSTANTLY
ONE-STROKE COMMANDS
PRINT RECIPES

\$24.95 EACH

Send M.O. plus \$1.50 shipg. to:

MasterCharge - Visa send acc. # and exp. date
N.Y. Residents add applicable tax
Dealer inquiries accepted

HomeSpun
software
9 Peter's Path
E. Setauket, N.Y. 11733



"Gormal buys a Computer" 1984 Calendar

Share in the adventure of Gormal each month with a new hilarious, side splitting comic from the "Gormal Buys a Computer" calendar for 1984. Gormal stumbles through the world of Hardware, Software and Robotics from the Corporate Office to his home.

Gormal is Coming...

The Gormal 1984 Color Calendar

Please send me copy(s) of the "Gormal Buys a Computer" Calendar for 1984 (\$69.95 (Utah residents add \$5.50, sales tax) +\$50 postage & handling to:
Computer Humor, Inc.
P.O. Box 859
Park City, UT 84060



©1983 Computer Humor, Inc.



TRIUMPH WITH A WINNER!

VIC 20*

COMMODORE 64*

PM Software (RKTape/Disk):	C64 Disk Games:
Business Programs: AT, AB,	PT:Apocalypse"Chopper"...\$29.95
Order/Invoice, Gen Selg/21	Tongue of Spoken"Adv"...\$39.99
Inventory, Payroll...\$39.99	ProMaster27"Space Ball"...\$39.99
Computed Tape/Unexpanded:	Tvi Micro (Disk):
Math Juggler: MS-Dos...\$14.95	Keep On (Solo Race)...\$24.95
Word Design Gr. 1.....\$14.95	Tvi Order (87, 88, Gen.
Helios Tape/Disk:	Leider, Inventory)...\$149.99
Newsletter Package	Confidential (Disk):
(10K Tape/Disk)	Rom Accountant.....\$49.99
Complete to make personal-	PM (Disk/Tape):
ized-form letters...\$39.95	24 programs for C64...\$19.99

Send money order plus \$2 fee handling. Ask for new catalog.

PM SOFTWARE

Division of PM Business Services

4400 Arden View Ct. • St. Paul, MN 55112 • (612)633 0891

VIC 20 is a TM of Commodore Business Machines

Using The VIC/64 Function Keys

Jim Butterfield, Associate Editor

The function keys, f1 to f8, seem easy to use and understand. Yet, if you haven't made the right mental connections, they must seem baffling. One of the questions we're asked most often is "How do you make the functions keys work?"

You Can't Input

Let's talk about the INPUT statement for a moment. If your program contains an INPUT statement – or for that matter, if you try typing a direct command – the function keys don't seem to work. They really do work, but to little avail.

The point here is that INPUT takes its information from the screen – and the function keys don't show up on the screen.

When you press one of the keys, it is received and placed into the keyboard input buffer. During an input or direct statement – in other words, whenever the cursor is flashing – the keyboard buffer is promptly emptied and the characters there are printed to the screen. There's the problem: f1, f2, etc., have no printable equivalent, so at this point the characters are lost. Later, INPUT will see you press RETURN and will take its information from the screen, but there are no f-characters there.

In other words, INPUT or normal direct statements will lose the function keys. There's a way around this, but it's awkward: put your input within quotation marks, and the keys will be detected. They will also print oddly, but that's another story.

Another Story – GET

The GET command takes information directly from the keyboard buffer, so it will read these keys without problem. The question is: how does your program test to see if it has an f-key? The answer is easy, but it's rather graphic in nature – so try this on your machine:

```
100 GET X$
110 IF X$=""
```

and hold it right there.

At this moment, we're in the middle of line 110, and we've just typed the quotation mark. Now, press the f1 key, and you'll see an odd reverse graphic symbol printed. It's the "programmed cursor" equivalent of the key f1; it looks like a reversed horizontal bar, and for all intents and purposes it is key f1. Now finish the line so it looks like this:

```
110 IF X$="" THEN PRINT "FUNCTION 1"
```

Note to readers who have been skimming: don't type the characters f and 1 within the quotation marks; tap key f1 at this point.

Using the same system, we may work through all eight functions:

```
120 IF X$="" THEN PRINT "FUNCTION 2"
```

Key f2 is f1 with the shift key held down, of course; it prints a reverse quarter-circle. Keep going:

```
130 IF X$="" THEN PRINT "FUNCTION 3"
```

and so on until:

```
180 IF X$="" THEN PRINT "FUNCTION 8"
190 GOTO 100
```

You can run this program and play with the f-keys as long as you like. As you can see, the computer recognizes the keys without trouble.

In larger programs, you'll often want to GOTO when you see a given key. That's no trouble at all, of course.

Another Way

Those funny characters can be puzzling. They are hard to read and may be confused with each other. There's no listing standard for them yet. Sometimes it's useful to write them another way, without the funny characters.

```
100 GET X$:IF X$="" GOTO 100
110 X=ASC(X$)
```

We've changed our input key to an ASCII number. Every key has its own ASCII value; if we know the value, we'll know which key.

Now I could tell you the ASCII values for the eight function keys, but I'm not going to do that. Instead, I'll tell you how to find these values for yourself.

Suppose you want to find the ASCII number for key f1. Just type:

```
PRINT ASC("f1")
```

Remember to press the f1 key (don't type f and 1 as two characters), and you'll see the computer respond with a value of 133. That's the ASCII value of key f1.

Now we can continue the above program:

```
120 IF X=133 THEN PRINT "FN 1"
130 IF X=137 THEN PRINT "FN 2"
```

continuing to:

```
190 IF X=140 THEN PRINT "FN 8"
200 GOTO 100
```

I haven't given you the ASCII numbers to fill in the missing lines – but with a little care and attention, you can find them for yourself.

A Simple Example

Let's do a simple quiz, using the odd-numbered f-keys.

```
100 DATA WHO DISCOVERED AMERICA
110 DATA GALILEO, COLUMBUS, REAGAN, EINST
    EIN
120 DATA 2
130 DATA THE CHARGE ON AN ELECTRON IS
140 DATA NEUTRAL, POSITIVE, NEGATIVE, VARIAB
    LE
150 DATA 3
160 DATA UGANDA IS IN
170 DATA ASIA, SOUTH AMERICA, EUROPE, AFR
    ICA
180 DATA 4
190 DATA ***
200 READ Q$: IF Q$="" THEN END
210 PRINT Q$; "—"
220 READ A$: PRINT "F1 - "; A$
230 READ A$: PRINT "F3 - "; A$
240 READ A$: PRINT "F5 - "; A$
250 READ A$: PRINT "F7 - "; A$
260 PRINT "YOUR ANSWER? ";
270 READ A
280 GET X$: IF X$="" GOTO 280
290 X=ASC(X$)
300 IF X<133 OR X>136 GOTO 280
310 X=X-132: PRINT "F"; X*2-1
320 IF X=A THEN PRINT "RIGHT!"; GOTO 340
330 PRINT "WRONG!"
340 GOTO 280
```

You'll notice that line 220 calls for you to type the actual characters (F and 1), and the same goes for lines 230 to 250.

The program isn't the definitive educational package – but it does show how the function keys can be used effectively.

Without A Program

Sometimes you might like to have the function keys do something even when there is no program running. That's much tougher: if your program is not running, it can't do the job. You may have noticed that packages like the Super Expander provide this feature: pressing the f1 key might produce the word GRAPHIC on the screen.

This kind of thing utilizes advanced techniques. You would need to know machine language, and how to implement a wedge. It can be done – but it's not for beginners.

NEW!



ALPHABLITZ!
an exciting arcade word game... \$9.95

ANIMAX COMPUTER
1111 Las Vegas Blvd. South
Las Vegas, NV 89104

OTHER ANIMAX GAMES:
STARDROPPER...
A CUTE GAME FOR CHILDREN
OF ALL AGES... \$7.95
MAKE-A-GAME...
LEARN THE FUNDAMENTALS OF
CREATING A GAME... \$9.95 (KITS)

**AT LAST... AN INTERACTIVE
COMPUTER/VCR INTERFACE
FOR THE HOME!**



PROMETHEUS 1™
INTERACTIVE COMPUTER/VCR INTERFACE

Now, for the first time, you can have a completely interactive computer/video system at home for less than \$1,500. The Prometheus 1™ interface connects your Commodore 64 or VIC 20 computer to your consumer VCR, giving you a whole new range of entertainment and educational possibilities never before available in this price range. Send for our free literature and our catalog of entertainment/educational interactive courseware, or send check or money order (plus \$4.00 postage and handling) for the Prometheus 1™ interface.

\$49.95
No. 31 Rev. add 8% sales tax

SEND TO: **Intercom Corporation**
P.O. Box 16567
Seattle, WA 98109
OR CALL: (206) 282-3636

INCLUDE YOUR COMPUTER WARRANTY NUMBER AND RECEIVE A FREE PROMETHEUS 1™ POSTER! ALLOW 6-8 WEEKS FOR DELIVERY. ORDER NOW FOR CHRISTMAS.

All About The TI Character Set

Michael A. Covington

This brief outline of the TI character set explains how the computer recognizes each character. The author discusses some uses of the characters' numeric codes and indicates which characters' graphic representations can be assigned or changed.

Chances are you've never given your computer's character set much thought. You press keys on the keyboard and the characters appear on the screen; that's all there is to it, or so it seems. But there's a lot more going on than meets the eye.

Inside the computer, each character is represented by a *numeric code* — a number between 0 and 255 inclusive. For instance, the code for capital E is 69; the code for an exclamation mark is 33; the code for a blank (a blank is a character just like all the others) is 32. To associate these codes with the characters you see on the screen, the computer has to know two more things about each of them: a *graphic representation* that describes how the character is supposed to look on the screen, and a *key assignment* that indicates what key or combination of keys you can hit on the keyboard to type the character. For instance, the character string "HELLO THERE!" (not counting the quotation marks) involves the following:

Graphic representation:	H	E	L	L	O		T	H	E	R	E	!
Numeric code:	72	69	76	76	79	32	84	72	69	82	69	33
Key assignment:	H key	E key	L key	L key	O key	space bar	T key	H key	E key	R key	E key	shift & 1 keys

Statements Using Numeric Codes

Normally (when you type characters in response to a string INPUT statement or when you type them as part of a program) you enter characters by hitting the keys that correspond to them. That is, you access them by means of their key assignments, and within the program you treat them as character-string data. But there are ways of re-

ferring to characters by their numeric codes and treating them as numbers. For instance, the CALL HCHAR and CALL VCHAR statements, which you meet at an early stage as you work through the manuals that come with the computer, refer to characters by their numbers. The statement

```
CALL HCHAR(3,3,69,20)
```

will place a row of 20 capital E's (character number 69) on the screen beginning at row 3, column 3.

Also, you can input characters as numeric codes. The CALL KEY statement senses whether a particular key on the keyboard is up or down; when a key is pressed, CALL KEY gives you the numeric code corresponding to it. For instance, here is a program which will tell you the numeric code of any key on the keyboard:

```
10 PRINT "PRESS ANY KEY..."
20 CALL KEY(5,CODE,STATUS)
30 IF STATUS <> 1 THEN 20
40 PRINT CODE
50 GO TO 10
```

The heart of the program is lines 20 and 30. Line 20 tells the CALL KEY subroutine to look at the keyboard and report what's going on. The variable STATUS will equal 1 only if the condition of the keyboard has changed since the last time

the routine looked at it. If STATUS does not equal 1, we simply go back to line 20, since we don't want to do anything more if the user hasn't pressed a key or hasn't yet let go of the one already looked at. The variable CODE contains the numeric code associated with the key being pressed, if any. (The first parameter of CALL KEY, the number 5, simply indicates that we want the

usual BASIC set of codes; specifying other numbers then instructs the computer to use other sets of key assignments for various special purposes.)

The ASC and CHR\$ functions allow you to convert back and forth between numeric codes and character strings. If A\$ is a character string, ASC(A\$) is the numeric code of its first character; thus ASC("E") is 69. Conversely, if N is a number, CHR\$(N) is a one-character string of which N is the numeric code; thus CHR\$(69) is E. If we want the program above to print the characters themselves rather than their codes, we can convert the codes into characters by changing line 40 to:

```
40 PRINT CHR$(CODE)
```

The CALL CHAR subroutine allows you to alter graphic representations using a hexadecimal code that the manual describes in detail. For instance, if you want to change the dollar sign (\$) into a British pound sign (£), just execute the statement:

```
CALL CHAR(36,"001C22207C20207E")
```

That will do it, at least as long as the program is running: the key assignment and numeric code will be the same, but the dollar sign will look like a pound sign. (It will revert to its original appearance when your program stops executing.)

What's Not In The Manual

Those are the preliminaries; now we get to the really interesting part (the part that isn't in the manual, at least not entirely). Internally, the computer can use any number from 0 to 255 as a character code; any such code can be an element in a character string and can be referred to by CALL VCHAR, CALL HCHAR, and CHR\$. (In fact, CALL VCHAR, CALL HCHAR, and CHR\$ will actually take numbers up to 32767; multiples of 256 are subtracted as necessary to get a number in the 0-to-255 range.) But not all the codes have key assignments or graphic representations. The breakdown (by numeric codes) is as follows:

0 - Undefined (no key assignment, no graphic representation).

1 to 15 - Function keys (Table 1). Most of these characters can be input by means of the CALL KEY statement, but they cannot be typed in normal contexts (for example, in response to an INPUT) because there they are interpreted as requests to perform cursor movements or the like. They have no graphic representations (if you print them, you get blanks or garbled patches).

16 to 29 - Undefined (like 0, these codes have no key assignments and no graphic representations, and there is no straightforward way of giving them either).

30 - The graphic representation of this character is the black square that marks the cursor;

thus, CHR\$(30) is handy if you want a black square. No key is assigned to it.

31 - This is the screen border character - a blank that is the color of the border rather than the typing area. No key is assigned to it.

32 to 126 - Standard ASCII characters (Table 2). These are the characters you use every day, including the alphabet, the numbers, and all the punctuation marks and mathematical symbols. Their graphic representations can be changed with CALL CHAR but will revert to their original form when the program ends.

127 to 159 - User-defined characters (Table 3). These start out with no graphic representations, but you can define them with CALL CHAR, and, contrary to what the TI manual says, such definitions remain in effect after the program stops running (though most are disrupted when another program is loaded).

What most people don't realize is that these characters can be typed - they have key assignments and are acceptable in the same context as any other character (that is, in response to an INPUT or CALL KEY, or within quotes in a program). All but one of them require you to hold down the CTRL key (at the lower-left corner of the keyboard) when typing them; character number 127 uses the FCTN key instead.

160 to 175 - Undefined.

176 to 198 - These characters have key assignments (Table 4), but no graphic representations and no direct way of giving them any. They can be used as special function keys of some sort (in response to either CALL KEY or INPUT), but not as displayable characters.

199 to 255 - Undefined.

Even the "undefined" character codes (those that cannot be typed on the keyboard or displayed on the screen) are not completely useless. You can refer to them by means of CHR\$ and ASC and use them as special markers of various kinds when manipulating character strings. They also may come into play when you are transmitting data to other devices (for example, printers or other computers) that have definitions for characters that are undefined on the TI-99.

Finally, consider this possibility. Each character in a character string has a code between 0 and 255 inclusive, accessible through CHR\$ and ASC. Also, the SEG\$ function allows you to address individual characters in a string, and the & (concatenation) operator allows you to construct strings out of individual characters. This means that a character string gives you a compact way of storing a set of integers between 0 and 255 - each element occupies only one byte in memory, as compared to the eight bytes normally needed to store a number. So if you have a program that

needs to keep track of thousands of small integers – more than will fit in available memory in numeric form – then character strings may be the answer.

Table 1:
Function Key Codes

(None of these characters have graphic representations, nor can they be given them. They can be typed only through the CALL KEY statement, not in response to a string INPUT statement, or within a program.)

Code	Key
1	FCIN 7 ("AID")
2	None usable. The key definition associated with this code is FCIN 4, but in BASIC, hitting that key interrupts the program.
3	FCIN 1 ("DELETE")
4	FCIN 2 ("INSERT")
5	None usable. The key definition associated with this code is FCIN 5, but hitting that key forces a machine reset and the program in memory is lost.
6	FCIN 8 ("REDO")
7	FCIN 3 ("ERASE")
8	FCIN 5 (left arrow)
9	FCIN 4 (right arrow)
10	FCIN X (down arrow)
11	FCIN E (up arrow)
12	FCIN 6 ("PROC'D")
13	ENTER
14	FCIN 5 ("BEGIN")
15	FCIN 9 ("BACK")

Table 3:
User-definable Graphics Characters

These characters can be typed using the key combinations listed and are acceptable in any context (that is, they can be input using the CALL KEY or INPUT statements and can appear between quotes within a BASIC program).

Graphic representations can be given to these characters with the CALL CHAR statement. Contrary to TI documentation, such representations, once assigned, will persist after the program stops running.

Code	Key	Code	Key
127	FCIN V	144	CTRL P
128	CTRL , (comma)	145	CTRL Q
129	CTRL A	146	CTRL R
130	CTRL B	147	CTRL S
131	CTRL C	148	CTRL T
132	CTRL D	149	CTRL U
133	CTRL E	150	CTRL V
134	CTRL F	151	CTRL W
135	CTRL G	152	CTRL X
136	CTRL H	153	CTRL Y
137	CTRL I	154	CTRL Z
138	CTRL J	155	CTRL . (period)
139	CTRL K	156	CTRL ;
140	CTRL L	157	CTRL =
141	CTRL M	158	CTRL 8
142	CTRL N	159	CTRL 9
143	CTRL O		

Table 2:
ASCII Graphic Characters On The TI-99/4A

(This table gives the numeric codes and graphic representations; the key assignments are marked on the keyboard. The graphic representations can be changed by the CALL CHAR statements but revert to their original form when the program stops running.)

Code	Graphic Representation	Code	Graphic Representation
32	(space)	53	5
33	!	54	6
34	"	55	7
35	#	56	8
36	\$	57	9
37	%	58	:
38	&	59	;
39	'	60	<
40	(	61	=
41	)	62	>
42	*	63	?
43	+	64	@
44	,	65	A
45	- (minus)	66	B
46	.	67	C
47	/	68	D
48	0	69	E
49	1	70	F
50	2	71	G
51	3	72	H
52	4	73	I

74	J	97	a
75	K	98	b
76	L	99	c
77	M	100	d
78	N	101	e
79	O	102	f
80	P	103	g
81	Q	104	h
82	R	105	i
83	S	106	j
84	T	107	k
85	U	108	l
86	V	109	m
87	W	110	n
88	X	111	o
89	Y	112	p
90	Z	113	q
91	[	114	r
92	\ (back slash)	115	s
93	]	116	t
94	^	117	u
95	_ (underline)	118	v
96		119	w

120	x
121	y
122	z
123	{
124	|
125	}
126	-

See Table 3. TI documentation mistakenly classifies this character with the wrong group.

VIC/64 Tape Aids

Andrew Au

When you get a LOAD ERROR, what can you do? Can you recover the program? This article deals with the frustrating problem of tape loading errors. Also, there's a technique here which allows you to LOAD programs twice as fast as usual.

When you save your program, the VIC or 64 saves it twice on the tape. When the program is loaded, the first version is put into the computer and checked against the second version. Any mismatch will cause the LOAD ERROR.

If you get a load error, LIST the program. If it LISTs properly to the end, it can probably be recovered. Don't RUN the program yet, or it will be destroyed. The problem here is that the start of variable pointers are not set. Set these pointers by POKEing the value found by PEEKing 831 into locations 45,47,49; and POKEing the value found by PEEKing 832 into 46,48,50. After performing these six POKES, make sure that you have done everything correctly by typing PRINT FRE(0). If it shows a decrease in free RAM, your program is ready. Type RUN, and it should work.

However, if the computer just locks up, you have POKed the wrong values. Press RUN-STOP/RESTORE and rewind the tape to the beginning. Type OPEN 1 and play the tape. After the header is loaded, it will stop. Now 831 and 832 should contain the location of the variable pointer. Perform the above POKES and try again.

The Solution

When the VIC or 64 loads a program, it sets zero page pointers (which tell it how long the program is) and loads the program itself into BASIC RAM. Apparently, the computer sets the pointers after the program is loaded and checked. If the computer detects a load error, it does not update the pointers. So although you can LIST the program, the computer thinks there is nothing in memory.

If the program is RUN at this stage, the variables will overwrite the program and destroy it.

The POKES given above set the variable pointers to the correct values, which are found in the cassette buffer. Locations 829,830 and 831,832 hold the starting addresses (Lo/Hi) of the program and variables, respectively.

This cure works only if the program itself is loaded successfully. If the program is garbled, this method will not work. Fortunately, many load errors result from this pointer problem, so this technique is well worth knowing.

Loading Time Cut In Half

An 8K program takes two and a half minutes to load. Since the computer loads the program and then checks it, the actual loading takes only half the time. The value of the verification is doubtful since it won't correct any detected errors. All it does is report ?LOADING ERROR. As a rule, machine language programs can be stopped at the middle of the load and RUN (or SYSeD to) without problems, since there are no zero page pointers involved. On the other hand, BASIC programs need more attention if they are to RUN at "half time." Since the pointers are not set until the end of the load, they must be typed in manually or incorporated into the program.

Let's prepare a program so that it can be stopped at the middle and RUN (and still work). Add a line at the beginning of the program:

```
POKE 46,PEEK(832): POKE 48,PEEK(832): POK  
E 50,PEEK(832): POKE 45,PEEK(831): POK  
47,PEEK(831): POKE 49,PEEK(831)
```

Type in the above line (or make it two lines), and make sure it is at the beginning of your program. Now SAVE the program.

When this program is RUN after being stopped at the middle, it will first reset the pointers. Now we don't have to wait for the com-

puter to do it at the end. The result: the program LOADs twice as fast.

This technique can be used with any program to shorten loading time. Use the tape counter to find the middle of the program and allow it to go slightly past.

If you have consistent tape problems, try changing the location of your cassette recorder. Remember that data transmission is sensitive to electrical fields. You should keep the connecting cord away from the back of the TV, which is a strong source. Always verify your programs after saving.

COMPUTE!

**TOLL FREE
Subscription
Order Line
800-334-0868
In NC 919-275-9869**

VOICE WORLD'S 24K Golden RAM Expansion Chassis

NOW ONLY \$99.00! WAS \$149.00

- Programmer's dream—Game player's delight.
- Boosts VIC memory to 29K!
- 4 expansion slots with switches for instant cartridge selection—faster than a disk.
- Accepts any cartridge designed for the VIC 20®.
- System Reset Button.
- Plugs directly into your VIC 20®.
- 8 memory control switches—easy to configure in 8K banks for custom applications.
- Factory tested—one year limited warranty.



VOICE WORLD
13055 Via Espena
Del Mar, CA 92014
(619) 481-7350

VIC 20 is a registered trademark of Commodore Business Machines, INC.

- Start address selection at 2000, 4000, 6000, A000 HEX.
- ROM mode switches for memory write protection and PROM, EPROM emulation.
- Memory banks hold programs/data even when de-selected.
- Gold-plated connectors/send contacts for high reliability.
- Fused to protect your VIC 20®.

TO ORDER:

Send check or money order. Add 3.00 shipping and handling. California residents add 6% sales tax. COD Foreign orders add \$10.00. No foreign COD's.



ES TIME PLANNER
Electronic Software, Inc.
P.O. Box 765
Bloomfield Hills
Michigan 48303

"TIME IS MONEY"

With the ESI (Electronic Software, Inc.) Time Planner, a personal calendar and appointment file for your Commodore CBM or 64, your time is like money in the bank. On either a daily or monthly calendar, the "easy to use" ESI Time Planner can help you plan and program schedules for yourself, your personnel or your equipment. With over 40 powerful commands you can schedule in 15 or 30 minute intervals, an entire day, week or month. And to repeat, move, or reschedule any event, available time can be found instantly. "Easy," is exactly how the ESI Time Planner operates, with on-line HELP functions, color and sound assistance (64), time display, cross referencing, security passwords and 8½x11 print-out capabilities as well as a full color screen display of your complete schedule.

CAPACITIES

- 1800 to 8000 scheduled events per disk
- Schedule from now until the year 2000
- Schedule unlimited number of people or resources
- Unlimited comments and reminders per day per person

Add \$3 for shipping and handling. Mastercard Visa Check or M.O.



SELECT YOUR TIME PLANNER TODAY

Retail list prices

- ☐ 64/1541 only \$89
- ☐ 4032/1640 only \$149
- ☐ 4032/1600 only \$169
- ☐ 8032/1640 only \$249
- ☐ 8032/1600 only \$269

Remember: Time is Money. Clip this ad and order today so you're not wasting time and money.



WEIGHT CONTROL PROGRAMS

- 25 FULL DAY MENU PLANNER FOR DIETERS** with recipes, ingredient lists and recipe size adjuster for calorie levels from 1200 to 2400. That's 84 balanced meals! \$49.95 US
- 28 FULL DAY MENU PLANNER** with recipes for various diabetic distributions, based on ADA lists (84 balanced meals). Specify two calorie levels, 1200 to 2400. \$49.95 US
- RECIPE CALCULATOR**—an essential tool with a user friendly data base of over 700 foods. Input your recipe to get the amount of calories, carbohydrate, protein, fat, cholesterol and sodium; for the food exchange values; to adjust recipe sizes; and for daily meal analysis. \$64.95 US
- PLEASEANTLY PREGNANT**—At last a program for all pregnant couples. Enter number of weeks pregnant and find fun facts about your developing baby, normal physical changes, warning signs, and proper nutrition advice. **ALL WRITTEN BY AN OBSTETRICIAN!!!!** \$34.95 US

To order, or for more information on these and other programs, write to:

Festive Fare
P.O. Box 6447 Dept. C
Grand Rapids, Michigan 49506

Carefully available for Commodore 64/1541 disk drive and Apple II, Ix, IIfx, IIc and Franklin disk drives. Michigan residents add 4% tax.

Name ☐ MC or ☐ Visa ☐

Address

City/State Exp. Date

Signature

CBM and 64 are trademarks of Commodore Business Machines, Inc. ES and Time Planner are trademarks of Electronic Software, Inc.

Make Your Apple User-Friendly

Karen Goeller McCullough

With an Apple II and a disk drive, you can use this versatile utility program to create menus that call other programs—or you can merge it with your own multi-function programs to create an effective master menu.

If you have an Apple II with Applesoft BASIC and at least one disk drive, this handy utility can save time and prevent confusion by generating menu programs. All you do is tell the program the number of options on your menu and their names. From that information a BASIC program is generated which presents a nicely formatted display of the options, allows the entry of a selection, and checks it for validity.

The figure shows a sample menu created using "Menu Generator." You simply add the code to tell the program where to go after the option has been selected. The Menu program can be used on its own to call other programs, or it can be merged into your own programs using the renumber and merge options in the "Renumber" program on the *System Master* diskette.

```
<1> INITIALIZE DATA DISKETTE  
<2> SET UP NEW FILE  
<3> ADD ENTRIES TO FILE  
<4> CHANGE ENTRIES ON FILE  
<5> DELETE ENTRIES ON FILE  
<6> PRINT MAILING LIST  
<7> PRINT MAILING LABELS  
<8> EXIT FROM SYSTEM
```

Menu Generator uses an Apple DOS feature to create a program as a text file and then EXEC it. The EXEC command treats a text file as a series of commands that are executed just as though they had been entered from the keyboard. Delayed execution commands (those that have line num-

bers in front of them) are saved in memory to await a RUN command. (For more information on EXEC files, see pages 75-79 of the *DOS Manual*.) The EXEC command lets you write a BASIC program that will produce another BASIC program which can be immediately EXECed into memory and RUN, or SAVED to disk as a program file. Menu Generator is an example of how this feature can be used for almost unlimited program generation.

Program Breakdown

In the Menu Generator program, lines 10-50 initialize the screen and variables. Line 100 sends us to line 1000 to begin processing. Lines 200 and 250 are subroutines that clear either a part of the screen (200) or a given line V (250). These are placed close to the beginning of the program to speed execution.

Lines 1000-1060 input the number of options desired on the menu. A string variable is used to input the number, and lines 1030-1040 scan the input string for valid numeric characters (ASCII 48-57). If an invalid character is detected, a flag (E) is set. The flag is then tested in line 1050, and, if true, execution is returned to the input statement at 1020.

This may seem a cumbersome process, since using a numeric variable would obviate the need for lines 1030-1050. However, in applications where an attractive screen format is important, this routine avoids the ?REENTER statement which appears if you try to enter a nonnumeric character into a numeric variable.

The options to appear on the menu are entered in lines 1070-1200. The array OP\$ holds the option names, and the array element number also functions as the option number. For example, if option number 1 on the menu is to be INITIALIZE

DATA DISKS, then that will be the contents of OP\$(1). After all the options are entered and checked for length of less than 30 characters, the program checks to see if changes are desired (1210-1420).

Beginning at line 2000, the text file which builds the program is created. The text file is opened in lines 2010-2040, and the first line is printed at 2045. Since the EXEC command itself does not clear the program currently in memory, the first line of the exec file issues an FP command, which prevents the EXECed program from overlying the calling program. The POKE 34,24 in lines 2047 and 1420 prevents the screen from scrolling and the cursor from bouncing around while the EXEC file is being processed.

Menu Generator Variable List

A\$ - yes or no answer input
 CH\$ - holds a single character for error checking
 D\$ - return + control-D (CHR\$(13) + CHR\$(4))
 E - error flag
 H - horizontal print location
 I - counter for FOR/NEXT loops
 L - length of longest option
 L1 - temporarily holds length of each option
 N - number of options on menu
 N\$ - number of options (input string)
 NN - option number to change
 NNS - option number to change (input string)
 N1 - option number selected on menu
 OP\$ - array holding option names
 Q\$ - quote mark (CHR\$(34))
 V - vertical print location

Creating The New Program

The beginning of the new program being created (the menu program itself) is at line 2050. Lines 2050-2220 actually write the menu program, beginning with the header which will be lines 10-30 in the new program (lines 2050-2070 in the creating program). The variable N is set equal to the number of options, and the array OP\$ is DIMed to N in line 40 (2080). The array OP\$ is loaded with the option names in line 50 (2090), and line 2110 of the creating program causes the OP\$ array to be printed as the DATA statement of line 70 of the new program. The length of the longest option line is found in line 2120; this information is used to calculate the horizontal positioning in line 2140. The same line also calculates the vertical positioning using the number of options (N).

After displaying the menu options, the program asks for the selection to be input. Input and validation procedures (2180-2220) are the same as those used for the option number input in the creating program. Line 2220 is the end of the delayed execution part of the text file, and it remains in memory while the EXEC function continues to

the last two lines of the text file. Line 3010 causes the program which has been LOADED into memory from the text file to be SAVED to disk as a program file called MENU-PROGRAM, and the next line causes it to be RUN.

Printing of the text file is concluded by line 3040, which CLOSEs the text file. The last line of the program issues the DOS EXEC command, which executes the text file. You now have the menu program SAVED on disk and displayed on the screen, ready to make any modifications you might wish.

Menu Generator

```

1 REM "*****"
2 REM "# MENU GENERATOR #"
6 REM "*****"
10 REM
20 TEXT : HOME : HTAB 13: PRINT "MENU
  GENERATOR"
30 VTAB 2: HTAB 1: FOR I = 1 TO 40: PRINT
  "-";: NEXT I
40 DIM OP$(12)
50 D$ = CHR$(13) + CHR$(4): Q$ = CHR$(
  34): REM D$=CONTROL-D; Q$=QUOTE MA
  RK
100 GOTO 1000
199 REM COMMONLY USED SUBROUTINES
200 VTAB 22: HTAB 1: CALL - 950: VTAB
  22: RETURN
250 VTAB V: HTAB 1: CALL - 860: VTAB
  V: RETURN
999 REM
1000 REM ENTER NUMBER OF OPTIONS DESI
  RED ON THE MENU
1001 REM
1010 GOSUB 200: HTAB 1: PRINT "YOU MAY
  CHOOSE UP TO 12 MENU OPTIONS OF":
  PRINT "UP TO 30 CHARACTERS EACH I
  N LENGTH"
1020 V = 5: GOSUB 250: INPUT "ENTER NUM
  BER OF MENU OPTIONS (1-12) ": N$
1030 E = 0: FOR I = 1 TO LEN(N$): CH$ =
  MID$(N$,I,1): CH = ASC(CH$): IF
  CH < 48 OR CH > 57 THEN E = 1
1040 NEXT I
1050 ON E GOTO 1060,1020
1054 REM
1055 REM ENTER THE MENU OPTIONS
1056 REM
1060 N = VAL(N$): IF N < 1 OR N > 12, THEN
  GOTO 1020
1070 V = 7: GOSUB 250: PRINT "ENTER OPT
  ION NAME NEXT TO THE NUMBER"
1075 GOSUB 200: PRINT "NO COMMAS, COLO
  NS OR QUOTE MARKS IN THE": PRINT "
  MENU OPTIONS PLEASE"
1080 FOR I = 1 TO N
1090 V = 7 + I: GOSUB 250: PRINT I: INPUT
  " ": OP$(I)
1100 IF LEN(OP$(I)) > 30 THEN GOTO
  1090
1200 NEXT I
1210 V = 20: GOSUB 250: PRINT TAB(10)
  "ANY CHANGES (Y/N) ": GET A$: IF
  A$ = "N" THEN GOTO 1400
1220 IF A$ < "Y" THEN GOTO 1210
1230 V = 20: GOSUB 250: PRINT TAB(5)
  "CHANGE NO. OF OPTIONS (Y/N) ": GET

```

```

A%: IF A% = "N" THEN GOTO 1300
1240 IF A% < > "Y" THEN GOTO 1230
1250 GOTO 1000
1300 V = 20: GOSUB 250: HTAB 5: INPUT "
ENTER OPTION NUMBER TO CHANGE ": NN
%: IF LEN (NN%) > 2 THEN GOTO 13
00
1310 E = 0: FOR I = 1 TO LEN (NN%): CH%
= MID% (NN%, I, 1): IF ASC (CH%) <
48 OR ASC (CH%) > 57 THEN E = 1
1320 NEXT I
1330 ON E GOTO 1340, 1300
1340 NN = VAL (NN%): IF NN < 1 OR NN >
N THEN GOTO 1300
1350 V = 7 + NN: GOSUB 250: PRINT NN: INP
UT " : OP% (NN)
1360 IF LEN (OP% (NN)) > 30 THEN GOTO
1350
1370 GOTO 1210
1400 FOR I = 1 TO N: L1 = LEN (OP% (I))
: IF L1 > L THEN L = L1
1410 NEXT I
1420 POKE 34, 24
2000 REM BUILD TEXT FILE
2010 PRINT D%: "OPEN MENU-FILE"
2020 PRINT D%: "DELETE MENU-FILE"
2030 PRINT D%: "OPEN MENU-FILE"
2040 PRINT D%: "WRITE MENU-FILE"
2045 PRINT "FP"
2047 PRINT "POKE 34, 24"
2050 PRINT "10 REM MENU PROGRAM"
2053 PRINT "12 TEXT: HOME"
2055 PRINT "15 VTAB 1: FOR I=1 TO 40: PR
INT "Q% "-Q% ": NEXT I"
2060 PRINT "20 VTAB 2: PRINT TAB(1B) "Q
% "MENU"Q%
2070 PRINT "30 VTAB 3: FOR I=1 TO 40: PR
INT "Q% "-Q% ": NEXT I"
2080 PRINT "40 N%:=N%: DIM OP% ("N%")"
2090 PRINT "50 FOR I=1 TO N: READ OP% (I
): NEXT I"
2100 PRINT "60 GOTO 80"
2110 PRINT "70 DATA ": FOR I = 1 TO N
- 1: PRINT OP% (I): ", ": NEXT I: PRINT
OP% (N)
2120 PRINT "80 FOR I=1 TO N: L1=LEN(OP%
(I)): IF L1>L THEN L=L1"
2130 PRINT "90 NEXT I"
2140 PRINT "100 V=(INT(24-N)/2)-1: H=IN
T((40-(L+4))/2)"
2160 PRINT "110 IF N<9 THEN FOR I=1 T
O N: VTAB V+1: PRINT TAB(H) "Q% "<"Q%
" "Q% "> "Q% ": OP% (I): NEXT I: GOTO 120"
2170 PRINT "112 FOR I=1 TO 9: VTAB V+1:
PRINT TAB(H) "Q% "<"Q% " "Q% "> "Q% ":
OP% (I): NEXT I"
2175 PRINT "114 FOR I=10 TO N: VTAB V+1
: PRINT TAB(H-1) "Q% "<"Q% " "Q% "> "Q
% ": OP% (I): NEXT I"
2180 PRINT "120 VTAB 23: HTAB 8: INPUT
"Q% "ENTER SELECTION : "Q% ": N%
2190 PRINT "130 IF LEN(N%)>2 OR LEN(N%
)<1 THEN GOTO 120"
2200 PRINT "140 E=0: FOR I=1 TO LEN(N%)
: CH%=MID%(N%, I, 1): IF ASC(CH%)<48 O
R CH%(CH%)>57 THEN E=1"
2210 PRINT "150 NEXT I: IF E=1 THEN GOT
O 120"
2220 PRINT "160 N1=VAL(N%): IF N1<1 OR
N1>N THEN GOTO 120"
3010 PRINT "SAVE MENU-PROGRAM"
3030 PRINT "RUN"
3040 PRINT D%: "CLOSE"
3050 PRINT D%: "EXEC MENU-FILE"

```

**computer
case
company**

WE MAKE A GREAT CASE FOR YOUR COMPUTER.

One size does not fit all. Our cases are designed for specific hardware configurations. When you put your computer in our case, it fits hand-in-glove. Once your equipment is safely inside the attaché-style carrying case, it never has to be taken out again. To operate, simply remove the lid and connect the power. To store your computer, disconnect the power, enclose your disks, working papers, and manuals in the compartment provided, and attach the lid. It's as easy as that.

• AP101	Apple II with Single Drive	.....	\$109
• AP102	Apple II with Two Disk Drives	.....	119
• AP103	Apple II 9-inch Monitor & Two Drives	.....	129
• AP104	Apple III, Two Drives & Silentype Printer	.....	139
• AP105	13" Black & White Monitor with Accessories	.....	99
• AP106	Amdek Color I, II or III Monitor	.....	119
• FR152	Franklin Ace 1000 or 1200 with Two Drives	.....	119
• FR153	Franklin Ace 1000 or 1200 with Two Drives & 9" Monitor	.....	139
• RS201	TRS-80 Model I Computer, Expansion Unit & Drives	.....	109
• RS204	TRS-80 Model III	.....	129
• AT301	ATARI 400 or 800 Computers with Peripherals	.....	109
• P401	Paper Tiger Printer (400/445/460)	.....	99
• P402	Centronics 730/737 & Radio Shack Printer	.....	89
• P403	Epson MX70 or MX80, Microline 82A Printer or Color Computer	.....	89
• P404	Epson MX100 Printer	.....	99
• P405	IDOS 580 or Prism 132 Printer	.....	109
• P406	C. Itoh Stenwriter/Printmaster F-10 Printer	.....	119
• P407	Dixdata Microline 83A or 84 Printer	.....	99
• P408	C. Itoh Prowriter 2 Printer	.....	99



• P409	C. Itoh Prowriter (Apple Dot Matrix) or NEC PC8023 Printer	89
• IB501	IBM Personal Computer with Keyboard	129
• IB502	IBM Monochrome Monitor	99
• HP601	HP41 with Accessories	99
• CM702	Commodore 64 (or Vic 20) with One Drive	119
• CM703	Commodore Model 64 with Two Drives	129
• CM704	Commodore Model 64 with Datasett	109
• NS010	North Star Advantage	139
• CC80	Matching Attache Case (5")	85
• CC80	Matching Attache Case (3")	75
• CC81	Matching Accessories Case (5 1/4" Diskettes, Paper, etc.)	95
• CC82	5.25" Diskette Case (Holds 75 Diskettes)	49
• CC50	Case Cart	79

CALL TOLL FREE: (800) 848-7548

Computer Case Company, 5650 Indian Mound Court, Columbus, Ohio 43213 (614) 868-9464



Variable Lister

E A Cottrell

This utility lists all your program variables in order, including variable type (simple, array). It's a helpful tool, especially for checking long programs and writing documentation. For the VIC and 64.

There are two types of variables, simple and array, and three categories in each type, floating point numeric, integer numeric, and string. All of these variables are stored in the VIC and 64 immediately after the BASIC program.

The simple variables are stored below the arrays starting at the address pointed to by memory locations 45 and 46 (see box). Each of these simple variables occupies seven bytes of memory. The first two bytes contain the first two characters (in ASCII) of the name of the variable, with coding to indicate which type of variable it is. This coding is accomplished by adding 128 to both characters if it is an integer variable and by adding 128 to the second character if it is a string variable. No coding indicates a floating point variable. The remaining bytes in numeric variables contain the value of the variable. In the case of string variables, the remaining bytes contain the length of the string and the location at the top of memory which contains the first character of the string.

Arrays are quite different in that the length of the variable is determined by the number of elements in the array. The information which must be stored for an array variable includes the name of the variable, which is coded the same as for a simple variable, a pointer to the location of the next variable, the number of dimensions in the array, and the number of elements in the array.

In addition, the value of each element in the case of numeric arrays, or the pointer to the string and its length for string arrays, must be stored. As you can see, array variables can eat up a lot of

memory in a hurry. It is best to use the lowest possible number of elements in your arrays. If you do not specify the size of an array, the computer will set it at ten elements. If you need less than ten, you will save a minimum of five bytes per element if you establish the size of the array with a DIMension statement. Although a simple integer variable takes up the same amount of memory as a simple floating point variable, three bytes per element can be saved if you use integer instead of floating point variables in arrays.

LOADING The Lister

"Variable Lister" is a machine language (ML) program which is loaded by POKes using a BASIC program, thus eliminating the need for an assembler. The ML is automatically loaded into the top of memory and protected from your BASIC program. Before you RUN the program, be sure to SAVE a copy since it self-destructs after it is run. When the machine language is loaded, the loader program will give you the location to SYS to when you want to list your variables. For example, with 16K of expansion memory plugged into your VIC, you would type SYS 24320 in order to list your variables. The program will then list the simple variables in the order of appearance in the program, with indicators of their type. Next the array variables will be listed with proper indicators.

Variable Lister is especially useful when you write programs with many variables and have to find new names. It is also valuable for documenting programs when they are completed.

The variables are listed across the screen to prevent them from scrolling out of view. If you have a printer, the following changes may be made to give you a listing which may be easier to read.

```
100 IF PA <> 33632 THEN PRINT "DATA ERROR"  
"END
```

Address Pointers

Now and then you'll see a reference to "pointers" within the computer's memory. These are two-byte long numbers, usually located in the first 256 memory cells of the computer, which hold an important address.

Things change while a program is running or being written. For example, if you add a line to a BASIC program, you've expanded the amount of space that the program is taking up in RAM memory. Obviously, when you go to SAVE the program, the computer has to know where the BASIC program ends. So, it keeps track of the "current top of BASIC program" in a pointer. This pointer is located (in the VIC and 64) in addresses 45 and 46. The number held in cell 46 is multiplied by 256 and then added to the number in cell 45. To see at which address in RAM memory your current BASIC program ends, you can type: `? PEEK (45) + PEEK (46) * 256`.

There are a number of other pointers as well, including "limit of memory," "start of arrays," "string storage," and "start of BASIC." The locations of these pointers are listed in *memory maps* for each computer which have been published in *COMPUTE!* and in various *COMPUTE!* Books. They are also frequently available from user groups. There are some interesting things you can do by manipulating these pointers with POKES. For one thing, you could fool the computer into reserving space for programs in odd places, or even partitioning memory so that two independent BASIC programs could run simultaneously. In any event, pointers hold information essential to the computer, and their values can be accessed using the formula above.

Lister, then find the lines on which they appear with the Searcher. Both of these programs may be loaded together. Remember that if you use the Searcher program, remove line 0 and RUN the program before using the Lister.

Variable Lister

```

120 ME= PEEK(55) + 256 * PEEK(56)
130 VS= ME - 256: PA= 0
140 POKE 56, PEEK(56) -1
150 FOR I= VS TO VS + 240: READ A: POKE I,
    A: PA= PA + A: NEXT
160 IF PA <> 33670 THEN PRINT "DATA ERROR
    ": END
170 PRINT "SYS" VS "TO START": NEW
180 DATA 165,45,197,47,240,93,133
190 DATA 253,165,46,133,254,160,0
200 DATA 169,0,141,61,3,177,253
210 DATA 41,128,208,60,177,253,41
220 DATA 127,32,210,255,200,173,61
230 DATA 3,201,0,208,6,177,253
240 DATA 41,128,208,46,177,253,41
250 DATA 127,32,210,255,173,61,3
260 DATA 32,210,255,169,32,32,210
270 DATA 255,152,24,105,6,144,5
280 DATA 164,254,200,132,254,168,101
290 DATA 253,197,47,240,17,208,186
300 DATA 96,169,37,141,61,3,208
310 DATA 189,169,36,141,61,3,208
320 DATA 203,165,49,197,47,240,114
330 DATA 165,47,133,253,165,48,133
340 DATA 254,168,0,169,0,141,61
350 DATA 3,177,253,240,216,41,128
360 DATA 208,77,177,253,41,127,32
370 DATA 210,255,200,173,61,3,201
380 DATA 0,208,6,177,253,41,128
390 DATA 208,63,177,253,41,127,32
400 DATA 210,255,173,61,3,32,210
410 DATA 255,169,40,32,210,255,169
420 DATA 41,32,210,255,169,32,32
430 DATA 210,255,200,177,253,24,101
440 DATA 253,197,49,240,39,177,253
450 DATA 24,101,253,170,200,177,253
460 DATA 101,254,133,254,134,253,208
470 DATA 165,96,169,37,141,61,3
480 DATA 208,172,169,36,141,61,3
490 DATA 208,186,165,48,197,50,208
500 DATA 136,96,200,234,177,253,101
510 DATA 254,197,50,240,224,16,222
520 DATA 136,208,202

```

```

260 DATA 32,210,255,169,13,32,210
420 DATA 41,32,210,255,169,13,32

```

To send the list to your printer, simply OPEN a file to your printer:

```
OPEN1,4:CMD1:SYSXXXX
```

The BASIC program for which you wish to list variables must be RUN before you give the SYS to start the Lister. This is because the variables are not set up in memory until a program is RUN. If you're a VIC owner, this program works well in conjunction with "VIC Searcher" (*COMPUTE!*, February 1983). First, list the variables with Variable

Maxell Floppy Disks

The Mini-Disks
with maximum
quality.



Dealer inquiries invited. C.O.D's accepted.
Call FREE (800) 235-4137



PACIFIC EXCHANGES
1100 Third Street
San Jose, CA 95128
In CA call 800-235-4137 or
415-281-1033



HERE'S SOME GREAT GIFT IDEAS FOR YOUR COMMODORE-64 OR VIC-20 Computer

Every ABACUS SOFTWARE Package includes an attractive outer carton, a manual and a disk or cassette.

YOU CAN COUNT ON

Abacus Software



- ULTRABASIC 64**
- TURTLE, hawk, snailboat and some graphics
 - Sound and effects
 - Handcopy
 - 50 Powerful Commands
 - Includes Service Manual
 - \$39.95 FOR TAPE**
 - \$42.95 FOR DISK**



- SUPER DISK UTILITY 64**
- Single-Disk Only (3 types or modes)
 - Dump or Modify Any Disk Sector
 - Full Screened Directory Display with scrolling
 - RAM Display
 - Power Display
 - Fast Machine Code
 - \$29.95 DISK ONLY**



- STEWART 64**
- Test featured music and sound (speech)
 - Easy entry and scrolling on video screen
 - Control ASCII lines, characters and
 - Includes sample music and sound
 - \$29.95 FOR TAPE**
 - \$32.95 FOR DISK**



- CHECKBOOK MANAGER 64**
- Microfunction will make it very easy to use
 - Bankbook entry
 - Full checkbook totaling
 - Printout
 - \$22.95 DISK ONLY**



- CHARTPAK 64**
- Circle Pie, Bar and Line charts in high resolution
 - Export data to disk and mail to IBM PC
 - Choose any of 8 chart formats and design charts interactively
 - Produces both color and black and white printout
 - \$42.95 DISK ONLY**



- BIKER 64**
- Autistic type game
 - joystick or keyboard control
 - 3 different paths
 - 3 different levels
 - \$14.95 FOR TAPE**
 - \$17.95 FOR DISK**



- TINY TOWN**
- Early microscale language
 - Based on 16-BIT/16
 - Commodore 64 or Vic-20 with exp
 - \$19.95 FOR TAPE**
 - \$22.95 FOR DISK**



- GRAPHVICS**
- Writes and reads graphics
 - Fast plotting at machine language speed
 - Two screen graphics and text
 - Scale screen to tape/ disk
 - VIC-20 with or without exp
 - \$19.95 FOR TAPE**
 - \$22.95 FOR DISK**

DISTRIBUTORS

Great Britain:
ACAMSOFT
17 Norwich Ave
Sutton, Lancs

West Germany:
DATA BECKER
Meyringstrasse 36
4011 Düsseldorf
02123055

Sweden:
T&L TRADRA
P.O. 516
3K300 Alnäs
476-12304

Great Britain:
OO Software
167 Great Portland St
London W1
01-690-6354

Canada East:
KING MICROWARE LTD.
5550 Galt Ave
Mississauga, Ontario L5S 1Z6
514/337-8335

Australia:
OM ELECTRONICS
418 Logan Road
Brisbane, Queensland
07-367-0606

Canada West:
1 S.A. Distributors Ltd.
819 W Broadway #163
Vancouver, BC V5Z 4G9
604/333-0211

New Zealand:
MAGNUS ELECTRONICS
256-266 Church Street
Palmerston North
03-65-896

**TO ORDER NOW: Write Abacus Software
P.O. Box 7211 Grand Rapids, Mich. 49510**

For postage & handling, add \$1.50 (U.S. and Canada), add \$3.00 for foreign. Make payment in U.S. dollars by check, money order or charge card. Michigan Residents add 4% sales tax.

FOR QUICK SERVICE PHONE 616/241-5510

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

CHARGE CARD _____ NUMBER _____

FREE CATALOG Ask for a listing of other Abacus Software for Commodore-64 or Vic-20

Atari Polycopy

Edward Boyer

This convenient utility program lets you copy at least 16 selected files from one or more disks—all in a single pass. It's also useful for reformatting a disk with multiple files.

"Polycopy" is a disk file copy utility designed for users with only one disk drive; many Atari owners will therefore find this program useful. Using a minimum DOS on a 48K system, it can copy over 225 sectors in a single pass. With the exception of DOS.SYS (which it never copies), an entire disk can be copied in only three passes. Polycopy is especially handy if you must reformat a disk with multiple files. You will also find it useful when you're copying programs or files.

What makes this program different from Atari DOS disk and file copy is its ability to selectively copy more than one file in a single pass. Polycopy uses machine language routines to perform the disk I/O. These routines are far more efficient than the BASIC GET and PUT instructions. In an effort to save all available RAM, Polycopy deletes its initialization lines once initialization is complete. It will become a valuable part of your disk library.

Program Operation

After initialization, you will be asked to insert a FROM disk; insert the disk and press any key. Each filename on the disk will be displayed. Type a C if you want the file copied, a Q if you're finished with this disk, or any other key to bypass this file. The files will continue until all have been displayed or the maximum of 16 files has been selected. You can increase or decrease the limit of 16 by changing the value of DSN in line 395.

You will then be asked for another FROM disk if fewer than 16 files have been requested. If you respond with a Y, the process will continue,

allowing you to select more files from a different disk.

If you respond N for additional disks, you will be asked to review the filenames selected (all will still be on the screen). If you're in agreement, press Y and the copying will proceed. If you press any other key, the copy is aborted.

As the program runs, you will be prompted to insert FROM and TO disks at the appropriate times. Also, progress reports will be given to inform you that all is proceeding well.

Error Handling

During the loading pass, if Polycopy can't find a file on the disk in use, it will ask you if you want to try another disk. If you respond Y, it will prompt you to insert a new FROM disk. If you respond N, it will skip to the next requested file, thus ignoring the file it couldn't find.

If a full disk condition occurs while writing on the TO disk, you will be told of the condition and asked if you want to try another disk. If you answer Y, the partial file will be erased from the current disk, and you will be requested to insert a new TO disk. It is extremely important that you not remove the current disk or insert a new one until requested, because Polycopy erases the partial file from the current disk before requesting you to change it.

If the program uses all the available RAM before it finishes reading a file, it will write out the current portion to the new disk then retrieve the remainder on the next pass. This will be noted by the presence of a slash (/) after the size. If a full disk condition occurs during the writing of a split file, you will be asked to insert the FROM disk (the one with the file that was originally split). It will then recopy the file in its entirety, before requesting a new TO disk.

It is important that you respond to the ques-

tions and prompts only when requested; don't change disks until you are asked to. Impatience here can lead to irrecoverable files.

Any other I/O errors encountered will result in the skipping of the file currently being processed.

You may abort Polycopy anytime by pressing the ESCAPE key. It's important to use this rather than BREAK or SYSTEM RESET since it provides an orderly (although not always immediate) termination, thus insuring the integrity of your files and no misallocated sectors on the disk.

Program Explanation

Lines 15-40 set up the table of files to be copied.

Lines 45-125 load files into buffer, check for errors and full buffer.

Lines 130-225 write files on new disk from buffer, check for errors and full disk.

Line 230 places the next filename to be read or written in DSN\$.

Lines 250-320 build table of filenames to be copied by displaying filenames found in disk directory.

Lines 325-370 - miscellaneous prompts and input routines.

Lines 375-455 define variables, open the keyboard, and POKE the machine language routine into the printer buffer.

Lines 450-455 delete lines 375-450 to make additional room.

Line 460 allocates most of available RAM as the copy buffer.

Note: Line 445 bypasses the routine to delete lines 375 through 450 to allow you to test Polycopy conveniently. This line should be removed from your operational version to allow the largest possible buffer.

If you don't want to type in Polycopy, I will make a copy for you. Send a blank formatted disk, a postage-paid return mailer, and \$3 to:

Edward Boyer
81 Sequoia Drive
Coram, NY 11727

Polycopy

```
15 GOTO 375
16 GRAPHICS K0:PRINT "POLYCOPY - ATA
  RI version 2.0"
20 PRINT "(Space for ";INT(BUFF/125)
  "; sectors)":PRINT:IP=K1
25 GOSUB 250:IF IP=OSN THEN 40
30 IF IP<OSN THEN GOSUB 355:IF Z=YES
  THEN 25
35 IF IP<K1 THEN 235
40 MAX=IP-K1:PRINT "Type 'Y' if o.k.
  ":GOSUB 335:PRINT:IF Z<>YES TH
  EN 235
45 IP=K0:OP=K0:SPLIT=HI:APND=HI:GOTO
  55
50 PRINT:GOSUB 325
55 ADDR=ADR(Y%):ROOM=BUFF
60 IF IP>MAX THEN IP=IP-K1:GOSUB 145
  :GOTO 240
```

```
65 Y=IP:GOSUB 230:TRAP B0:OPEN #K1,K
  4,K0,DSN$:TRAP TOFF
70 IF SPLIT<>IP THEN PRINT "Loading
  ":DSN$:GOTO 100
75 TRAP B0:POINT #K1,SEC,BYTE:TRAP T
  OFF:APND=IP:PRINT "Contin'g ";OSN
  $:GOTO 100
80 TRAP TOFF:Z=PEEK(195):CLOSE #K1:I
  F Z<>170 THEN 110
85 PRINT:PRINT OSN$;" not found,":P
  RINT ".do you want to try anothe
  r disk?":
90 GOSUB 350:PRINT:IF Z=YES THEN PR
  INT "Insert new disk":GOSUB 330:
  GOTO 65
95 X(IP,K0)=K0:IP=IP+K1:GOTO 60
100 X(IP,K0)=ADDR
105 SIZE=USR(CIO,K1,7,ADDR,ROOM):Z=P
  EEK(B51):IF Z<128 OR Z=136 THEN
  115
110 CLOSE #K1:PRINT:GOSUB 370:GOTO
  95
115 PRINT "size=":SIZE:X(IP,K1)=SI
  ZE:IF Z=136 THEN 125
120 PRINT "/":NOTE #K1,SEC,BYTE:SPL
  IT=IP
125 PRINT:CLOSE #K1
130 ADDR=ADDR+SIZE:ROOM=ROOM-SIZE:IF
  ROOM<0 THEN IP=IP+K1:GOTO 60
135 GOSUB 145:IF SPLIT<>IP THEN IP=I
  P+K1:IF IP>MAX THEN 60
140 GOTO 50
145 IF ROOM=BUFF THEN RETURN
150 PRINT:PRINT "Insert 'to' disk";
  :GOSUB 330
155 ADDR=X(OP,K0):SIZE=X(OP,K1):IF A
  DDR=K0 THEN 220
160 Y=OP:GOSUB 230:Z=B:IF APND=OP TH
  EN Z=K1
165 TRAP B0:OPEN #K2,Z,K0,DSN$:TRAP
  TOFF:IF APND=OP THEN PRINT "App
  end'g ";GOTO 175
170 PRINT "Writing ";
175 PRINT OSN$;" size=":SIZE
180 Z=USR(CIO,K2,11,ADDR,SIZE)
185 Z=PEEK(B67)
190 TRAP 190:CLOSE #K2:TRAP TOFF:IF
  Z<128 THEN 220
195 IF Z<>162 THEN GOSUB 370:GOTO 22
  0
200 PRINT "Disk full!, try another? [Y
  /N]":IF Z=162:GOSUB 335:IF Z<>
  YES THEN 235
205 TRAP 210:XIO 33,#K2,K0,K0,OSN$
210 TRAP TOFF:IF APND<>OP THEN PRINT
  "Insert new disk":GOSUB 330:GO
  TO 155
215 IP=OP:SPLIT=HI:APND=HI:GOTO
  50
220 IF OP<IP THEN OP=OP+K1:GOTO 155
225 RETURN
230 OSN$="0":DSN$(K3)=X$(Y#K12+K1,Y
  #K12+K12):GOTO 360
235 PRINT:PRINT "User abort? [Y/N]
  ":GOSUB 335:IF Z=YES THEN 15
240 CLR:END
250 GOSUB 325:CLOSE #K3:OPEN #K3,6,K
  0,"O:1.1":IF IP<K0 THEN IP=K0:X$
  ="":PRINT "Enter disk name":
  INPUT #K3,Y$:IF LEN(Y$)<17 THEN
  320
```

NOW

For Vic-20
Commodore 64
Atari
T.I. 99/4" 5.99
See...

Switchable gateplate™
locks out the diagonals
(GREAT FOR MAZE GAMES!)



PRECISELY. THE REASON WHY YOUR NEXT 'STICK' SHOULD BE

Prostick
ARCADE-STYLE JOYSTICK

The Prostick™ features left/right hand fire buttons
Full five year limited warranty
Now available!—Prostick is for Colecoision™

newport controls DIVISION OF CALTRON

BISHOP, CA 93514 (408) 358-3430
DEALER INQUIRIES INVITED

Atari, Commodore, Texas Instruments and Colecoision are trademarks
respectively of Warner Communications, Inc., Commodore, Inc., Texas
Instruments and Coleco

```

260 DSN$="" :FOR Z=K3 TO I3:IF Z=I1 T
HEN DSN$(LEN(DSN$)+K1)=". "
265(3 SPACES)IF Y$(Z,Z)="" THEN 275
270(3 SPACES)DSN$(LEN(DSN$)+K1)=Y$(Z
,Z)
275(3 SPACES)NEXT Z:IF DSN$="DOS.SYS
" THEN 255
280 IF LEN(DSN$)<K12 THEN DSN$(LEN(D
SN$)+K1,K12)="(11 SPACES)"
285 SEC=K0:TRAP 290:SEC=VAL(Y$(15,17
))
290 TRAP TOFF:PRINT IP+K1:POKE COL,
5:PRINT DSN$:POKE COL,22:PRINT
SEC:POKE COL,28:PRINT "?":GOSUB
8 340
295 IF Z=67 THEN PRINT CHR$(30);"C":
GOTO 310
300 PRINT CHR$(ERASE);:IF Z=81 THEN
320
305 GOTO 255
310 X$(LEN(X$)+K1)=DSN$:IP=IP+K1:IF
IP=DSN THEN 320
315 GOTO 255
320 CLOSE #K3:RETURN
325 PRINT "Insert 'from' disk";
330 PRINT " , press any key!";
335 GOSUB 340:PRINT CHR$(ERASE);:RET
URN
340 GET #K4,Z:IF Z=27 THEN POP :GOTO
235
345 RETURN
350 GOSUB 340:PRINT :RETURN
355 PRINT :PRINT "Any more files?":
GOTO 335
360 Z=PEEK(764):POKE 764,HI-K1:IF Z=
28 THEN 235
365 RETURN
370 PRINT "C":Z;" I/O error on ";DS
N$:PRINT "...skipping to next fi
le!":PRINT :RETURN
375 REM Remove This Line
380 GRAPHICS K0:POSITION I3,I2:PRINT
"Remove This Line";
385 K0=0:K1=1:K2=K1+K1:K3=K2+K1:K4=K
3+K1:K12=K4:K3:HI=256:TOFF=40000
390 YES=89:LET ERASE=156:COL=YES-K4:
OPEN #K4,K0,"K":
395 DSN=16:DIM DSN$(16),X$(DSN*K12),
X(DSN-K1,K1)
400 CIO=960:FOR Y=K0 TO 42:READ Z:PO
KE CIO+Y,Z:NEXT Y:POKE 709,PEEK(
710)
405 DATA 104,104,104,10,10,10,10,170
410 DATA 104,104,157,66,3,104,157,69
415 DATA 3,104,157,68,3,104,157,73
420 DATA 3,104,157,72,3,32,86,228
425 DATA 189,72,3,133,212,189,73,3
430 DATA 133,213,96
435 MAX=842:APND=35
440 IP=375:OP=450:REM Remove This Line
445 GOTO 460:REM Remove This Line
450 PRINT CHR$(125):PRINT :FOR Z=IP
TO OP STEP 5:PRINT Z:NEXT Z:PRIN
T "CONT":POSITION K0,K0:POKE MAX
,I3
455 STOP
460 POKE MAX,K12:BUFF=FRE(K0)-APND:D
IM Y$(BUFF):BUFF=BUFF-K3:GOTO 150

```

PEEK And PRINT For The VIC-20

Carolyn D Bellah

These two programs let you design and display characters four times normal size. You can store up to seven of these larger characters and recall them later for screen displays or a printout.

The two programs here allow you to design large custom characters, twice as high and twice as wide as regular characters, save them, and print them.

Program 1 sets up a programmable character grid in which you move your cursor to a desired location on the grid and hit any letter key to print at that location.

Several options are available in Program 1. There is a color (1 to 8) choice, an option to save or erase your created character, and an option to draw another. Seven characters can be stored in a protected area of RAM and can be recalled, printed, and listed in sequence by using Program 2.

Another useful feature is that the program will display the decimal PEEK values (the numeric values that are used for DATA statements) that represent your finished character. You can use Program 1 without Program 2. Program 1 isn't a long program, but it does use most of the available memory in the unexpanded VIC. For this reason, REM statements are not included. When typing in this program, do not use unnecessary spaces.

When you finish designing with Program 1, type NEW (be sure to save a copy first), and enter Program 2. This second program allows you to examine memory to see the decimal values for the data created by Program 1, and to print the values (to screen and graphics printer) along with your created character.

Program 2 also allows you to print a reversed image of your created character and the corresponding decimal PEEK values.

Here's an explanation of the programs.

Program 1

Lines

8-9 Reset top of memory pointers; copy 32 characters into protected RAM; DIMension array to

recall marked grid for revision; set variables for characters and display; leave a clean slate to draw on.

10

Create string to draw grid (shifted @ key) and strings for positioning characters, inputs, etc., throughout program.

11

Array from which bit values are read.

14-16

Draw grid and set up display.

17-30

Keyboard controls.

31-33

Read grid, store values, display design.

34-36

Offer options and, with 59-63, show figure in chosen color moving around screen.

48-49

Print figure and values. The last number printed is the next address to be POKEd. If this is 7672, all available characters have been programmed.

49-54

Offer options.

64-70

Redraw marked grid for revision after display in color and motion.

Program 2

Lines

10-50

Set up display of design; print DATA values; show first and last address PEEKed.

55

Get a name for the design being displayed.

60-140

Set up display of character reversed horizontally. Increment CHR\$ for next design.

170

PEEK registers; reverse values; list them in proper order for program use.

200-250

Restructure the data for use by the screen dump routine.

600-620

Print a copy of the character design on a VIC 1515 or 1525 graphics printer.

60000-60070

(Program 2 is also handy for checking out the contents of other locations. Just change the value of PC in line 10 from 7448 to whatever address interests you.)

Program 2: Character Creator

```
2 PRINT{CLR}"SPC(5)"[DOWN][RE]PROGRAMMA
BLK";PRINTSPC(4)"CHARACTER GRID"
3 PRINT"[2 DOWN][BLK]BEGIN AT TOP LEFT. "
;
4 PRINT"THECURSOR[2 SPACES]CONTROLS
[2 SPACES]AND SPACE BAR WILL BEHAVE NOR
MALLY. ALPHANUMERICKEYS ";
5 PRINT"MARK THE GRID.":PRINT"[2 DOWN]HIT
F1 TO SEE DESIGNEDCHARACTER.
6 PRINT"[GRN][2 DOWN][RIGHT]HIT RETURN TO
BEGIN
7 GETM$:IFM$<>CHR$(13)THEN7
```



CORDLESS TELEPHONES

up to 700 ft. range
from \$69.75

Education \$109.75
Programmer \$ 51.75

Entertainer \$ 63.75
Bookkeeper \$164.75

800XL \$555\$149.00
800 XL... \$CALLS
1200 XL... \$499.00
1400 XL... \$CALLS
1450 XL... \$CALLS
1025 Printer \$399.00
1020 Color Printer \$395.00
1027 Printer \$299.00
1010 Recorder \$175.00
410 Recorder \$75.00
610 Disk Drive \$392.00
1050 Disk Drive \$335.00
650 Interface \$CALLS

PARKER BROTHERS

Tutenkham R \$33.75
Super Cobra R \$33.75
Astro Chase R \$33.75
Frogger R \$33.75
QBert R \$33.75
Poppye R \$33.75
Risk R \$42.75
Chess R \$42.75

SPINNAKER

Story Machine R \$26.75
Face Maker R \$24.75
Kindercomp R \$20.75
Frection Fever R \$24.75
Delta Drawing R \$26.75

Battle of Shilo C/D \$26.75
Tigers in the Snow C/D \$26.75
Battle for Normandy C/D \$26.75
Knights of the Desert C/D \$26.75
Cosmic Balance C/D \$26.75

ON-LINE

Frogger \$24.95
Wizard & Prin \$26.95

ROKLAN

Wizard of War \$29.75
Golf \$29.75
Delux Invader \$27.95

Box 5 \$33.75
Miner 2049 \$32.75

BUSINESS

Visicall \$159.75
Letter Perfect \$59.75
Letter Perfect \$69.75
Data Wizard \$69.75
Text Wizard \$49.75
Spell Wizard \$64.75
File Manager \$59.75
Home File Mgr \$69.75
Bookkeeper \$119.75
C.R.A.S. \$109.75
Atan Word Pro \$109.75
Tax Advantage \$35.75
Home Accountant \$59.75
Bank Street W \$49.75

ATARI WRITER

..... \$74.75

ADVENTURE

Preppie \$19.95
Preppie 2 \$19.95
Diskay \$39.95
See Dragon \$25.50
Starlok \$25.00
Treasure Quest \$13.50
Series 1-12 \$15.95
Sage Series 1-6 \$24.95
Stone of Sisyphus \$29.95
Eliminator \$19.95



SSI
Battle of Shilo \$26.75
Tigers in the Snow \$26.75
Cosmic Balance \$26.75
Knights of the Desert \$26.75
Battle for Normandy \$26.75
Germany 1955 \$36.75

RANA DISK DRIVES

Elite 1 \$295.00
Elite 2 \$449.00
Elite 3 \$559.00

MICRO-SCI

A2 cell
A40 cell
A70 cell
MUSE
Castle Wulstein \$20.75
Cassins of Finetop \$20.75
Robot War \$26.75

CONTINENTAL Home Accountant \$51.75 Book of Apple Software \$16.75

Bank Street Writer \$44.75
AE \$24.75
Apple Panic \$21.75
Chopfitter \$24.75
David's Midnight \$24.75

SPINNAKER

Kindercomp \$21.75
Story Machine \$23.75
Face Maker \$23.75
Snooper Trooper \$26.75
Delta Drawing \$34.75

EPYX

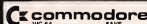
Temple of Apath \$26.95
Star Warrior \$26.95
Crash, Crumble & Chomp \$22.75

ADVENTURE

Sage#1 Adventureland \$29.95
Sage#2 Pirate Adventure \$29.95
Sage#3 Secret Mission \$29.95
Stone of Sisyphus \$24.95

ALIEN GROUP

Atari Voice Box \$99.00
Apple Voice Box \$129.00



VIC 64 \$AVE
1541 Disk Drive Cell
1525 Printer Cell
1530 Desette \$64.00
1110 Bk Rem \$53.75
1211 Super Expender \$53.75
1212 Programmer Ad \$44.75
1213 Vicman \$44.75
Vic 20 dust cover \$6.99
Vic 64 dust cover \$6.99

MICROSPEC 64

Inventory Mgr \$79.75
General Ledger \$79.75
Payroll Mgr \$79.75
Accounts Rec \$79.75
Accounts Pay \$70.75
Data Rese \$69.75
Checkbook Bal \$54.75

HES 64

64PortH \$55.75
Hesman R \$29.75
Turtle Graphics R \$49.75
Heswriter R \$36.75
Gundrinner R \$29.75
Attack of Mut Cam R \$34.75
Turtle Tutor R \$29.75
Turtle Trainer R \$29.75
Paint Brush R \$23.75
Ben! Space Rescue D \$29.75
Home Manager C/D \$39.75
Time Money Mgr D \$55.75
OmniCalc D \$79.75
Second Point D \$24.75

EPYX 64

Temple of Apath \$26.00
Upper Reaches of A \$15.00
Crash Crumble & C \$23.00
Jumper \$26.00

CARDCO

Cardprinter / L01 \$499.00
Cardprint DMI \$109.00
5 Slot Expansion 64 \$54.00
64 Write NOW \$39.00
64 Mail NOW \$39.00
2 Write NOW \$29.00
64 Keypad \$29.00
Universal Cass. Int. \$29.75
Printer Utility \$19.75
6 Slot Expansion \$79.95
3 Slot Expansion \$24.95
Vic 20/64 Printer int. \$59.95

BRODERBUND 64

Serpentine R \$26.75
Chopfitter R \$32.75
Beefor R \$26.75
PARKER 20
Frogger (ROM) \$33.75
QBert (ROM) \$33.75
Tutankham \$33.75

SPINNAKER 64

Kindercomp \$21.75
Story Machine \$23.75
Face Maker \$23.75
Snooper Trooper \$29.75
Delta Drawing \$34.75
Shamus II c/d \$24.95
Pinhead c/d \$22.95

QUICK BROWN FOX

QBF Word Processor \$49.95
LJK
Letter Perfect \$105.00
Data Perfect \$95.00

ADVENTURE INTERNATIONAL

S. Adams Adventure \$26.75

VIC-64

WORDPRO 3+ \$69.75
Vic 20
King Arthur Her Cass \$24.75
Monitor Beta \$24.75



HARD DISK DRIVES for

APPLE IBM-PC TRS-80
5MEG \$1349.00
10MEG \$1599.00
15MEG \$1999.00
20MEG \$2359.00

*Add \$30.00 for TRS-80 boxes

SINGLE DRIVE AT88 S1 ... \$349.00
DUAL DRIVE AT88 S2 \$535.00
AT88 with printer port \$449.00
AT88 Doubler Board \$129.00
DUAL HEAD 44S1 \$575.00
DUAL DRIVE 44S2 \$899.00
SINGLE DRIVE 40S1 \$499.00
TI Drive \$339.00

Lyc Computer Marketing & Consultants

TO ORDER
CALL US

TOLL FREE 800-233-8760

In PA 1-717-327-1624

32K RAM \$65.75
 48K RAM \$89.75
 64K RAM \$109.75
 TECHNICAL NOTE \$29.75
 KEYBOARD \$79.75

BOOK OF ATARI
 SOFTWARE 1983
 346 pages \$16.75

CX415 HOME FILING
 MANAGER \$41.75
 CX4007 MUSIC COMP \$33.75
 CX4002 ATARI BASIC \$34.75
 CX4126 MICROSOFT \$65.75
 CX4119 FRENCH \$45.00
 CX4116 GERMAN \$45.00
 CX4120 SPANISH \$45.00
 CX4106 HANGMAN \$12.75
 CX4102 KINGDOM \$12.75
 CX4112 STATES \$12.75
 CX44003 ASSEMBLER \$45.75

EASTERN HOUSE
 Monkey Wrench 2 \$52.75
 INHOME
 Baseball \$29.95
 IDS
 Speedway Glst \$29.95
 Pool T.S. \$26.95

GALAXIAN \$29.75
 DEFENDER \$29.75
 DIG DUG \$29.75
 SPEED READING \$53.75
 ATARI WRITER \$54.75
 BOOKKEEPER \$102.75
 CX4018 PILOT HOME \$54.75
 CX 405 PILOT EDU \$61.75
 CX404 WORD PRO \$99.75
 CX4013 ASTEROID \$25.75
 CX4020 CENTIPEDE \$29.75
 CX4023 PACMAN \$29.75
 CX4011 STAR RAIDER \$29.75
 CX4004 BASKETBALL \$25.75
 CX4006 SUPER BREAK \$25.75
 CX4008 SPACE INVAD \$25.75
 CX8130 CAVERNS OF M \$27.75

APX
 Eastern Fl.41 \$25.50
 DeRay Atari \$19.95
 Meth-Tic-Tac \$15.95
 Pres of US \$15.95
 3R Math \$19.95
 Type Attack \$24.95
 Family Budget \$19.95
 F. Cash Flow \$19.95

BRODERBUND
 Bank Street Writer 0 \$44.75
 AE 0 \$24.75
 Apple Pairs D \$23.75
 Choptiller ROM \$32.75
 David's Midnight \$24.75
 Stellar Shuttle C/D \$16.75
 Ft. Apocalypse \$24.75
 HES
 Gridrunner R \$27.75
 Sword Point 0 \$24.75

INFOCOM
 Zork 1/2/or 3 \$29.95
 FIRST STAR
 Astro Chess \$22.95

RANA
 DISK DRIVE
 1000 \$CALL

ALIEN GROUP
 Voice Box 2 \$99.75
 DON'T ASK
 Sam \$41.75
 Abuse \$15.95
 Telest \$27.95
 Poker Sam \$24.95

Amulet
 Nuke Sub \$16.75
 Magic Story Book \$24.75
 Thunder Island \$13.95
 ARTWORK
 Hazed Run \$24.95
 Dodge Dodge \$16.95
 S. Poker \$26.95
 Bridge 3.0 \$15.95

EPYX
 Jumpmen \$25.97
 Temple of Apeah \$27.75
 Star Warrior \$27.75



MODEMS

ANCHOR MARK I \$74.75
 MARK II \$74.75
 HAYES 1200 \$96.75
 MICRO 2 \$274.75
 SMART \$214.75
 NOVATION CAT \$144.75
 J-CAT \$155.75
 D-CAT \$114.75
 MICROBIT \$196.75

MONITORS

NEC JB1260 \$115.00
 NEC JB1201 \$145.00
 NEC TC1201 \$315.00

Amdel Color \$275.00
 Amdel 300 Green \$149.00
 Amdel 300 Amber \$149.00
 GORILLA GREEN \$68.00
 KTV (13" Color 1 yr. war.) \$229.00

WICO JOYSTICKS

APPLE - VIC - ATARI - TI
 Command Control \$20.55
 Redball \$22.75
 Apple Trackball \$58.00
 TRACK BALL \$52.75
 EXTENSION CORD \$9.75
 APPLE ADAPTOR \$18.95
 T.1 ADAPTOR \$9.95
 POINT MASTER \$12.75



APPLE DUMPLING GX \$99.75
 APPLE DUMPLING 64 (16 built) \$179.75
 INFOCOM
 Zork I, II, or III \$26.75
 Deadline \$33.75

BLANK DISKETTES

ELEPHANT 5 1/4" \$10.35
 ELEPHANT 5 1/4" \$21.75
 KANGAROO 5 1/4" with
 800000 case \$24.75
 MAXELL MD I \$29.75
 MAXELL MD II \$39.75
 DISK CASE (holds 10) \$4.95
 DISK CASE (holds 50) \$19.75
 ROM CASE (holds 10) \$19.75

SANYO NEW COMPUTER LINE NOW IN STOCK \$CALLS

MRC4050 \$2749.00
 EPD 160 Disk \$499.00
 5500 Letter O. Printer \$649.00

PRINTER

INTERFACING AVAILABLE

APPLE DUMPLING GX \$99.75
 APPLE DUMPLING 64 (16 built) \$179.75

	ATARI	APPLE	VIC
EPSON	\$35.00	\$79.00	\$65.00
CITRON	\$35.00	\$79.00	\$65.00
NEC	\$35.00	\$79.00	\$65.00
OKIDATA	\$35.00	\$79.00	\$65.00
GEMINI	\$35.00	\$79.00	\$65.00
SMITH CORONA	\$35.00	\$79.00	\$65.00

Atari parallel Printer cable (8') \$39.95

Microbits Parallel Interface & Cable \$74.75

commodore

HES VIC-20

Torg C \$14.75
 HES Games I C \$14.75
 HES Games II C \$14.75
 VIC Font Rom \$42.75
 HES MON Rom \$26.75
 Turtle Graphics Rom \$26.75
 HES Writer Rom \$26.75
 Shemus Rom \$26.75
 Protector Rom \$31.75
 Robot Penic Rom \$26.75

DISKETTE SALE

BULK DISKS (qty 150) \$1.50 ea
 Cartron CC-10 (3 blank cassette) \$3.75

PRINTER
 RIBBONS
 AVAILABLE

PROWRITER 2P \$679.00
 GEMINI 15 \$439.00
 PRINTMASTER \$1589.00
 SMITH CORONA TP \$549.00
 CITRON 8600S \$1029.00
 STARWRITER \$1099.00
 OKIDATA 82 \$AVE
 OKIDATA 83 LOWEST
 OKIDATA 84P PRICE
 OKIDATA 93 AVAILABLE
 TRACTOR \$49.75
 OKIDATA 92 \$SAVE

SAVE on these in-stock PRINTERS

GORILLA GX-100 \$195.00
 GEMINI 10X \$279.00
 PROWRITER \$349.00
 NEC 8023 \$379.00
 DELTA 10 \$479.00
 EPSON LINE \$CALLS
 DIABLO 630 \$1749.00



TO ORDER



POLICY

In-stock items shipped within 24 hours of order. Personal checks require four weeks clearance before shipping. No deposit on C.O.D. orders. Free shipping on prepaid cash orders within the continental U.S. PA residents add sales tax. All products subject to availability and price change. Advertised prices show 4% discount offered for cash, add 4% for Master Card or Visa. DEALER INQUIRIES INVITED.

CALL TOLL FREE
800-233-8760
 In PA 1 717-327-1824

or send order to
 Lyco Computer
 P.O. Box 5088
 Jersey Shore, PA 17748

```

8 POKE52,29:POKE56,29:CLR:FORI=7424TO7679
:POKEI,PEEK(1+25600):NEXT:DIMCT%(255):J
=35
9 PC=7448:FORI=7448TO7679:POKEI,0:NEXT
10 GS="{[RVS]@@@@@@@@@@@@@@@@@":PS="{[HOME]
[19 DOWN]":PLS="{[22 RIGHT]"
11 AS(0)="{128":AS(1)="{64":AS(2)="{32":AS(3
)="{16":AS(4)="{8":AS(5)="{4":AS(6)="{2":A
S(7)="{1"
12 PRINT"[CLR]":POKE36869,255:FORG=1TO16:
PRINT"[BLK]":GS:NEXT
13 PRINT"[HOME]":UP:[RVS][BLK]076543218765
4321":FORX=1TO8:PRINT"[RVS]"LEFT$(PS,1
+X)LEFT$(PLS,16)X:NEXT
14 FORX=1TO8:PRINT"[RVS]"LEFT$(PS,9+X)LEF
T$(PLS,16)X:NEXT
15 CR$="{[2 SPACES]":DOWN}[2 LEFT]"+CHR$(J)
+CHR$(J+1)+"[DOWN]":[2 LEFT]"+CHR$(J+2)+
CHR$(J+3)+"[DOWN]":[2 LEFT]"+[2 SPACES]"
16 PRINT"[OFF]":HOME:[2 DOWN]LEFT$(PLS,18
)CR$LEFT$(PS,20)"[RVS][GRN]HIT FI TO S
EE DESIGN.[HOME]"
17 GETM$:IFM$=""THEN17
18 IFPEEK(211)=16ANDPEEK(210)=31ANDPEEK(2
09)=90THENPRINT"[HOME]":DOWN":
19 IFPEEK(210)=31ANDPEEK(209)=100THENPRIN
T"[HOME]":DOWN":
20 IFPEEK(211)=16THENPRINT:GOTO17
21 IFM$<>CHR$(20)ANDM$<>CHR$(148)THEN22
22 IFM$=CHR$(13)THENPRINTCHR$(13):GOTO17
23 IFM$=CHR$(17)THENPRINTCHR$(17):GOTO17
24 IFM$=CHR$(29)THENPRINTCHR$(29):GOTO17
25 IFM$=CHR$(145)THENPRINTCHR$(145):GOTO
17
26 IFM$=CHR$(157)ANDPOS(M$)<>0THENPRINTCH
R$(157):GOTO17
27 IFM$=CHR$(32)THENPRINT"[RVS][BLK]"CHR$(
186):GOTO17
28 IFM$=CHR$(133)THENPRINTCHR$(133):GOTO3
1
29 PRINT"[RVS][BLU]"CHR$(166):
30 GOTO17
31 B=0:L=7702:FORI=1TO2:FORZ=LTO1+154STEP
22:D=0:C=0:GOSUB56:PC=PC+1:NEXT:L=L+8:
NEXT
32 L=7878:FORI=1TO2:FORZ=LTO1+154STEP22:D
=0:C=0:GOSUB56:PC=PC+1:NEXT:L=L+8:NEXT
33 FORC=0076TO8186:POKE5C,32:NEXT
34 PRINTLEFT$(PS,19)"[RVS]LIKE IT? ":INP
UT"[RVS]Y OR N":N$
35 IFN$="Y"THEN37
36 IFN$="N"THENPRINTLEFT$(PS,19)"[RVS]CUR
SOR IS AT TOP LEFT":PC=PC-32:PRINT
[HOME]:GOTO17
37 PRINT"[CLR]":INPUT"[RVS]COLOR - 1 TO 8
":E
38 ONEGOTO39,40,41,42,43,44,45,46
39 PRINT"[BLK]":GOSUB59:GOTO47
40 POKE36879,110:PRINT"[WHT]":GOSUB59:PRI
NT"[BLK]":GOTO47
41 PRINT"[RED]":GOSUB59:GOTO47
42 PRINT"[CYN]":GOSUB59:GOTO47
43 PRINT"[PUR]":GOSUB59:GOTO47
44 PRINT"[GRN]":GOSUB59:GOTO47
45 PRINT"[BLU]":GOSUB59:GOTO47
46 PRINT"[YEL]":GOSUB59:GOTO47
47 POKE36879,27:PRINT"[CLR]":DOWN]
[8 RIGHT]":CR$:PRINTLEFT$(PS,8):
48 PC=PC-32:FORCH=1TO4:FORX=PC+7:PRIN
T"[RVS][BLK]"PEEK(X):PC=PC+1:NEXT:PRI
NT:NEXT
49 PRINT"[RVS]"PC:INPUT"[RVS]WANT TO SEE
[SPACE]IT AGAIN":N$
50 IFN$="Y"THEN37
51 INPUT"[RVS]REVIEW IT":Q$
52 IFQ$="Y"THEN65
53 INPUT"[RVS]DRAW ANOTHER":M$
54 IFM$="Y"THENJ=J+4:GOTO10
55 END
56 FORX=0TO7:CT%(B)=PEEK(Z+X):IPPEEK(Z+X)
=230THENC=VAL(AS(X))
57 IFPEEK(Z+X)=250THENC=0
58 D=D+C:POKEPC,D:B=B+1:NEXT:RETURN
59 PRINT"[CLR]":FORX=1TO18:PRINTLEFT$(PS,
X) " CR$:FORI=1TO75:NEXT:NEXT
60 FORX=1TO18:PRINTLEFT$(PS,19)LEFT$(PLS,
X)"[DOWN]":LEFT] [DOWN]":LEFT] [2 UP]":CR
$:FORI=1TO75:NEXT:NEXT
61 FORX=18TO1STEP-1:PRINTLEFT$(PS,X)LEFT$(
PLS,18)CR$:FORI=1TO75:NEXT:NEXT
62 FORX=18TO1STEP-1:PRINTLEFT$(PS,1)LEFT$(
PLS,X)CR$[2 UP] [DOWN]":LEFT] ":FORI=
1TO75:NEXT:NEXT
63 RETURN
64 B=0:PRINT"[CLR]"
65 B=0:PRINT"[CLR]"
66 FORQ=1TO8:FORX=1TO8:PRINT"[RVS][BLU]"C
HR$(CT%(B)):B=B+1:NEXT:PRINT:NEXT:PRI
NT"[HOME]":DOWN] [8 RIGHT]":
67 FORQ=1TO8:FORX=1TO8:PRINT"[RVS]"CHR$(C
T%(B)):B=B+1:NEXT:PRINT"[DOWN]
[8 LEFT]":NEXT:PRINT
68 PRINT"[UP]":FORQ=1TO8:FORX=1TO8:PRINT
"[RVS]"CHR$(CT%(B)):B=B+1:NEXT:PRINT:
NEXT
69 PRINT"[8 UP] [8 RIGHT]":FORQ=1TO8:FORX
=1TO8
70 PRINT"[RVS]"CHR$(CT%(B)):B=B+1:NEXT:P
RINT"[DOWN] [8 LEFT]":NEXT:PC=PC-32:GO
TO13

```

Program 2: Character Printer And Screen Dump

```

1 PRINT"[CLR]":TAB(40)"[RED]PEEK AND PRINT
8 PORT=1TO2500:NEXT:DIMC%(3,8,8)
10 PC=7448:J=35:POKE36869,255
20 CR$=CHR$(J)+CHR$(J+1)+"[DOWN]":[2 LEFT]
+CHR$(J+2)+CHR$(J+3)
30 PRINT"[CLR]":[3 DOWN] [9 RIGHT]":CR$
40 PRINT"[3 DOWN] [RVS]":PC=FORA=1TO4:FORX
=1TO8:PRINT"[RVS]"PEEK(PC):PC=PC+1:NEX
T:PRINT:NEXT
50 PRINT"[RVS]"PC-1
55 PRINT"[DOWN]":INPUT"[RVS]DESIGN NAME":
DN$:GOSUB600:GOSUB60000
60 PRINT"[2 DOWN]":INPUT"[RVS]REVERSE: Y
[SPACE]OR N":AN$
70 IFAN$="Y"THEN90
80 GOTO150
90 CR$=CHR$(J+1)+CHR$(J+2)+"[DOWN]":[2 LEFT]
+CHR$(J+3)+CHR$(J+2)
99 PRINT"[CLR]":[3 DOWN] [8 RIGHT]":CR$:PRINT
"[3 DOWN] [RVS]"
100 L=7168:M=0:RC=PC-24:GOSUB200
110 RC=PC-32:GOSUB200
120 RC=PC-8:GOSUB200
130 RC=PC-16:GOSUB200
140 RC=PC-32:FORM=0TO32:POKEPC+M,PEEK(L+M
):NEXT
150 PRINT"[HOME]":TAB(242)TAB(220):INPUT"
[RVS]DESIGN NAME":DN$:GOSUB600:GOSUB6
000

```

D.E.S.-SOFT™

a division of
DES-Data Equipment Supply Corp.



ZARCON

By Steven Prentiss

Destined to be one of the best arcade style games on commodore computers, Can you in your Zarcon Fighter shoot all the alien formations while flying through an asteroid field!

5 Levels of excitement

Joystick required

Vic-20 cassette

Commodore 64 cassette

9.95

9.95

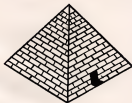
SHROOMS

Subterranean Encounter

By Michael Koberstein

Inner Earth has invaded the surface world. The mutant spiders and the moles have taken humans captive and changed them into mushrooms. To rescue them you must enter the caverns. You are their only hope. Good Luck!

Vic-20 & 8K Expander, Joystick-cass 9.95



SPHINX

3-D ADVENTURE

By Cory Christensen

You the Adventurous Explorer are looking for the lost treasure of the Sphinx. It is rumored to be in the Ancient Pyramid of RA. Beware of deadly traps and hidden passage ways.

Commodore 64-cassette

9.95

You are the commander of squadron of laser ships. It is your duty to defend the cities of earth against incoming alien attack. Spectacular Hi-Res graphics and machine code for super fast action.

Joystick Vic-20 cassette

9.95



SEE YOUR LOCAL DEALER TO SEE OUR FINE PRODUCTS

Dealer inquiries invited

Software Distribution Available

Programs wanted

(714)

D
E
S

Data Equipment Supply Corp.

(213)

778-5455

8315 Firestone Blvd., Downey, CA 90241

923-9361

VIC-20™, COMMODORE™, COMMODORE 64™, and CBM™ are trademarks of Commodore Business Machines, Inc.

```

155 PRINT"HOME"TAB(242)TAB(220) [RVS]H
IT RETURN TO GO ON"
160 GETA$:IFA$=""THEN160
170 J=J+4:GOTO20
180 END
200 FORR=CTORC+7:Y=PEEK(R):B=0:C=0
210 FORA=7TO0STEP-1:Y=INT(X/2FA):IFY<=0TH
ENZ=0:GOTO230
220 Z=2IC
230 B=B+2:C=C+1:IFZ=0THEN250
240 X=X-2FA
250 NEXT:PRINT"[RVS]"B;:POKEL+M,B:M=M+1:N
EXT:PRINT:RETURN
600 FORA=0TO3:FORB=0TO7:FORE=0TO7:C(A,B,
E)=0:NEXTE,B,A,B=DC-PC-32
605 FORA=0TO3:B=0:FORD=0TODC+6:X=PEEK(D)
:Y=0:FORE=7TO0STEP-1:Y=INT(X/2FE):IFY<
0THENY=0
608 IFY=0THENY=2
610 C(A,B,E)=Y+B:X=X-YFE:NEXT:B=B+1:NEXT
:DC=DC+8:NEXT
620 FORA=0TO3:FORB=0TO6:FORE=7TO0STEP-1:C
(A,B,E)=C(A,B,E)+C(A,B,E)+NEXTE,B,A
:RETURN
60000 REM SCREEN COPY
60010 R$=CHR$(145):V$=CHR$(146):OPEN4,4:P
RINT#4:G=PEEK(648)*256:PRINT#4,R$;
A=0:FORP=0TO4505
60020 C=PEEK(P):C$=""IF(P-G)/22=INT((P-G)
/22)THENPRINT#4,CHR$(8)+CHR$(13)+C
HR$(14);
60021 IFA>3THEN60030
60022 IFC=32THEN60060

```

```

60025 FORE=7TO0STEP-1:IPC(A,7,E)=0THENC$
=C$+CHR$(C(A,7,E)):NEXT
60026 C$=C$+CHR$(C(A,7,E))+128):NEXT:PRIN
T#4,CHR$(8):C$;A=A+1:NEXT
60030 IPC=128THENC=C-128
60040 IPC<32ORC>95THENC=C+64:GOTO60060
60050 IPC=63ANDC<96THENC=C+128:C$=""
60060 C$=C$+CHR$(C):IFLEN(C$)>1THENC$=C$
+V$+R$
60070 PRINT#4,C$;:NEXT:PRINT#4:CLOSE4:RET
URN

```

MOUNTAIN MICRO ELECTRONICS

216 Jeffery Ct. - P.O. Box 8097 - Irvine, Calif. 92714-8097 - 714/831-3367

COLUMBIA - FRANKLIN - ATARI

IUS - KENNINGTON - LOTUS - MICROPRO - MICROSOFT - PFS - MONOGRAM

MODEM

SPECIALS

ANCHOR SIGNALMAN

VOLKSMODEM W/CABLE \$70
MARK & HAYES COMPATIBLE \$115
MARK III (2400 BAUD) \$209
TELETYPE TERMINAL PGM \$36
HAYES TERM (AT & PRH) \$405
HAYES SMARTCOM (IBM PC & 68) \$69

CALL US NOW !!!

TO ORDER OR SEND \$100
FOR PRICE LIST - PLEASE SPECIFY
COMPUTER

PRINTER

SPECIALS

STAR GEMINI MX \$270
TRANSTAR 120 \$485
TRANSTAR 315 COLOR \$475

MONITOR

SPECIALS

USI PF-3 12" AMBER \$149
USI 15" COLOR COMPOSITE \$300
AMBER COLOR II BOX \$480
AMBER COLOR III BOX \$345

COMMODORE 64 \$189.95*

COMMODORE 64 Computer - only \$189.95!

*Value guaranteed with one of three choice packages

COMMODORE 64 \$189.95
with the purchase of:
1 1541 Disk Drive \$209.95
1 1525E Printer \$209.95
ALL FOR \$719.95

COMMODORE 64 \$189.95
with the purchase of:
1 1541 Disk Drive \$209.95
1 1541 Floppy Disk \$209.95
ALL FOR \$719.95

COMMODORE 64 \$189.95
with the purchase of:
1 1541 Disk Drive \$209.95
1 1541 Floppy Disk \$209.95
ALL FOR \$719.95

COMMODORE 64 Computer \$219.95
1541 Disk Drive \$209.95
1525E Printer \$209.95
1541 Floppy Disk \$209.95
1541 Disk Drive \$209.95
1541 Floppy Disk \$209.95
1541 Disk Drive \$209.95
1541 Floppy Disk \$209.95

COMMODORE 64 Computer \$219.95
1541 Disk Drive \$209.95
1525E Printer \$209.95
1541 Floppy Disk \$209.95
1541 Disk Drive \$209.95
1541 Floppy Disk \$209.95
1541 Disk Drive \$209.95
1541 Floppy Disk \$209.95

COMMODORE 64 Computer \$219.95
1541 Disk Drive \$209.95
1525E Printer \$209.95
1541 Floppy Disk \$209.95
1541 Disk Drive \$209.95
1541 Floppy Disk \$209.95
1541 Disk Drive \$209.95
1541 Floppy Disk \$209.95

COMMODORE 64 Computer \$219.95
1541 Disk Drive \$209.95
1525E Printer \$209.95
1541 Floppy Disk \$209.95
1541 Disk Drive \$209.95
1541 Floppy Disk \$209.95
1541 Disk Drive \$209.95
1541 Floppy Disk \$209.95

COMMODORE 64 Computer \$219.95
1541 Disk Drive \$209.95
1525E Printer \$209.95
1541 Floppy Disk \$209.95
1541 Disk Drive \$209.95
1541 Floppy Disk \$209.95
1541 Disk Drive \$209.95
1541 Floppy Disk \$209.95

COMMODORE 64 Computer \$219.95
1541 Disk Drive \$209.95
1525E Printer \$209.95
1541 Floppy Disk \$209.95
1541 Disk Drive \$209.95
1541 Floppy Disk \$209.95
1541 Disk Drive \$209.95
1541 Floppy Disk \$209.95

COMMODORE 64 Computer \$219.95
1541 Disk Drive \$209.95
1525E Printer \$209.95
1541 Floppy Disk \$209.95
1541 Disk Drive \$209.95
1541 Floppy Disk \$209.95
1541 Disk Drive \$209.95
1541 Floppy Disk \$209.95

COMMODORE 64 Computer \$219.95
1541 Disk Drive \$209.95
1525E Printer \$209.95
1541 Floppy Disk \$209.95
1541 Disk Drive \$209.95
1541 Floppy Disk \$209.95
1541 Disk Drive \$209.95
1541 Floppy Disk \$209.95



NEW ROYAL 64K ALPHATHONIC Computer
CP/M, color graphics, 3 video outputs -
RGB for res 60 col color displays
composite video-tape with any regular
monitor; modulated RF for use with your TV.
Electronic printer port, 40/80 col display,
KSC audio case, port REC: \$499.00 Year cost:
Optional 320 SIA* disk drive, \$379.95 \$499.95

TI COMPACT COMPUTER CC-40 only \$199.95
The most useful portable for your business!
Most powerful available in the 320K class!
Use one of 4 batteries - 2000 hours of operation typical!
100,000 Program Storage
CC-40 128K (128K) 128K (128K) 128K (128K)
CC-40 128K (128K) 128K (128K) 128K (128K)
CC-40 128K (128K) 128K (128K) 128K (128K)
CC-40 128K (128K) 128K (128K) 128K (128K)

COMPUTER PRINTERS & MONITORS
Quattro 128K Letter quality, 25 cps \$ 99.95
Quattro 128K Letter quality, 40 cps \$ 119.95
NEC 8024A 180 cps with Impact \$ 129.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95

COMPUTER PRINTERS & MONITORS
Quattro 128K Letter quality, 25 cps \$ 99.95
Quattro 128K Letter quality, 40 cps \$ 119.95
NEC 8024A 180 cps with Impact \$ 129.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95

COMPUTER PRINTERS & MONITORS
Quattro 128K Letter quality, 25 cps \$ 99.95
Quattro 128K Letter quality, 40 cps \$ 119.95
NEC 8024A 180 cps with Impact \$ 129.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95

COMPUTER PRINTERS & MONITORS
Quattro 128K Letter quality, 25 cps \$ 99.95
Quattro 128K Letter quality, 40 cps \$ 119.95
NEC 8024A 180 cps with Impact \$ 129.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95

COMPUTER PRINTERS & MONITORS
Quattro 128K Letter quality, 25 cps \$ 99.95
Quattro 128K Letter quality, 40 cps \$ 119.95
NEC 8024A 180 cps with Impact \$ 129.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95

COMPUTER PRINTERS & MONITORS
Quattro 128K Letter quality, 25 cps \$ 99.95
Quattro 128K Letter quality, 40 cps \$ 119.95
NEC 8024A 180 cps with Impact \$ 129.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95

COMPUTER PRINTERS & MONITORS
Quattro 128K Letter quality, 25 cps \$ 99.95
Quattro 128K Letter quality, 40 cps \$ 119.95
NEC 8024A 180 cps with Impact \$ 129.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95

COMPUTER PRINTERS & MONITORS
Quattro 128K Letter quality, 25 cps \$ 99.95
Quattro 128K Letter quality, 40 cps \$ 119.95
NEC 8024A 180 cps with Impact \$ 129.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95
Quattro 128K Graphics 128 cps in dot-matrix \$ 139.95

Olympic Sales Company

SEVING YOU SINCE 1947
Telex: 87 34 37 Telex Free Phone Orders
Toll-free for CA: 800-252-2153 800-621-8945 (rest of CA)
Order On-line 8 days a week! 7:00 AM to 6:00 PM Mtn Std
P.O. Box 74545 215 So. Del Amo Ave. Los Angeles, CA 90004
Phone (213) 735-1130 Cables: GYLAVR/LSA

TEXAS INSTRUMENTS
Home Computer
TI 99-4A
\$99.95
NET after \$20 rebate from TI
You pay at \$79.95!
Physical expansion slots \$129.95
PS 232 card \$129.95
Color monitor card \$129.95
Expansion Set disk drive \$129.95
Memory/teletype card \$129.95
PS 232 card \$129.95
Teletype card \$129.95
Color monitor \$129.95
Expansion Set \$129.95
LG60 \$129.95

HEWLETT
PACKARD
HP 75C Hand-held calculator \$179.95
HP 10C Scientific calc \$59.95
HP 11C Scientific calc \$69.95
HP 12C Financial calc \$69.95
HP 15C Scientific calc \$69.95
HP 16C Prog. sci. calc \$69.95
HP 67 Prog. sci. calc \$159.95
HP 41C Prog. calculator \$199.95
HP 41CV Prog. calculator \$199.95

SOFTWARE for
ALL MICRO-COMPUTERS
3000 titles available at great prices!
1-2-3 Lotus for IBM \$397.00
PFS File \$114.00
PFS Report \$99.95
D Base III \$219.00
Wordstar and more \$297.00
Recreation - and more \$79.95
Zaxxon \$39.95
Miner: 2049er \$39.95
Quadstar \$49.95
Zark II \$39.95
Zark III \$39.95

SOFTWARE for
ALL MICRO-COMPUTERS
3000 titles available at great prices!
1-2-3 Lotus for IBM \$397.00
PFS File \$114.00
PFS Report \$99.95
D Base III \$219.00
Wordstar and more \$297.00
Recreation - and more \$79.95
Zaxxon \$39.95
Miner: 2049er \$39.95
Quadstar \$49.95
Zark II \$39.95
Zark III \$39.95

SOFTWARE for
ALL MICRO-COMPUTERS
3000 titles available at great prices!
1-2-3 Lotus for IBM \$397.00
PFS File \$114.00
PFS Report \$99.95
D Base III \$219.00
Wordstar and more \$297.00
Recreation - and more \$79.95
Zaxxon \$39.95
Miner: 2049er \$39.95
Quadstar \$49.95
Zark II \$39.95
Zark III \$39.95

SOFTWARE for
ALL MICRO-COMPUTERS
3000 titles available at great prices!
1-2-3 Lotus for IBM \$397.00
PFS File \$114.00
PFS Report \$99.95
D Base III \$219.00
Wordstar and more \$297.00
Recreation - and more \$79.95
Zaxxon \$39.95
Miner: 2049er \$39.95
Quadstar \$49.95
Zark II \$39.95
Zark III \$39.95

SOFTWARE for
ALL MICRO-COMPUTERS
3000 titles available at great prices!
1-2-3 Lotus for IBM \$397.00
PFS File \$114.00
PFS Report \$99.95
D Base III \$219.00
Wordstar and more \$297.00
Recreation - and more \$79.95
Zaxxon \$39.95
Miner: 2049er \$39.95
Quadstar \$49.95
Zark II \$39.95
Zark III \$39.95

SOFTWARE for
ALL MICRO-COMPUTERS
3000 titles available at great prices!
1-2-3 Lotus for IBM \$397.00
PFS File \$114.00
PFS Report \$99.95
D Base III \$219.00
Wordstar and more \$297.00
Recreation - and more \$79.95
Zaxxon \$39.95
Miner: 2049er \$39.95
Quadstar \$49.95
Zark II \$39.95
Zark III \$39.95

Write For FREE Catalog

Call your order in and
get a FREE program

NEW

Call your order in and
get a FREE program

Write For FREE Catalog



(602) 855-3357



(602) 855-3357

VIC SOFTWARE CBM 64



CRICKET



POP TOP

**AVAILABLE 11/1/83
SHOGUN**

*A New Hi Res Graphic
Adventure For The Vic 20
Different Every Time!*

WORMS - CBM 64

PAK 20 -

20 Programs for the 64

GOLD QUEST

*A Hi Res Disk Adventure For
The CBM 64*



TREASURE PAK



BUG BLAST



PARATROOPER



VARG



**TARGET
COMMAND**



MOW

SOFTWARE FROM
COMPUTERMAT
WILL TURN
YOUR VIC OR 64
INTO A HOME
ARCADE



MUSIC MAKER

COMMODORE 64

(In Text)

Four Programs Include

- 1 Music Maker
- 2 Music Player
- 3 Player Utility
- 4 Music Demo

WE HAVE MORE
GAMES AND
CHALLENGING
PROGRAMS THAN
YOU CAN SHAKE A
JOYSTICK AT.



**ALIEN
INVASION**



SPACE PAK



SNAKE OUT



**64
ARCADE PAK**



STOMPERS - 64



SUPER PAK - 64



HEAD ON

ComputerMail • Box 1664 C • Lake Havasu City, Az. 86403 Add \$1.00 For Shipping

High Octane Transfer For Atari

Steve Kaufman

Data storage and retrieval with disk files can be a slow process. Using Atari's unique string length capability, the author presents programming techniques which will read a file of 10,000 characters in 14 seconds.

The storage and retrieval of data is a relatively simple procedure on most microcomputer systems. Unfortunately, the speed of the process can leave a great deal to be desired.

The programs throughout this article will illustrate a method of achieving high-speed data transfer to disk. Let's start with Program 1, which will create a file of names and occupations.

Program 1: Names And Occupations File

```
10 DIM NAME$(30), OCC$(15)
20 OPEN #1,0,0,"D:NAMEOCCU.DAT"
30 ? "NAME (RETURN ONLY TO END)";:IN
   PUT NAME$
40 IF LEN(NAME$)=0 THEN CLOSE #1:END
50 ? "OCCUPATION":INPUT OCC$
60 ? #1;NAME$;CHR$(155);OCC$
70 GOTO 30
```

This program is straightforward and simple, but simplicity does not imply efficiency. It does not cause disk access after every entry because DOS will write only to the disk when its sector buffer is full (every 125 bytes on single density drives, 253 on double density), but it does waste a lot of disk time in cases where a long file is being created.

Storing Data In Strings

More important, however, is the status of the data. Once a new name and occupation are entered, all the prior data is eliminated from RAM. It's on the disk, to be sure, but it becomes a rather tedious process to retrieve and modify it. A far better procedure, in terms of both disk access time and data manipulation flexibility, is to store all the data, as it is generated, in a single long string as demonstrated in Program 2.

Program 2: String Storage Of Data

```
10 DIM NAME$(20), OCC$(15), A$(10000)
20 ? "NAME (RETURN ONLY TO END)";:IN
   PUT NAME$
30 IF LEN(NAME$)=0 THEN GOTO 100
40 ? "OCCUPATION":INPUT OCC$
50 REM now pad the data with spaces
   so that each entry is the same length
60 IF LEN(NAME$)<20 THEN NAME$(LEN(NAME$)+1)=" ":GOTO 60
70 IF LEN(OCC$)<15 THEN OCC$(LEN(OCC$)+1)=" ":GOTO 70
80 A$(LEN(A$)+1)=NAME$:A$(LEN(A$)+1)=OCC$
90 GOTO 20
100 FOR X=0 TO LEN(A$)/35-1
110 PRINT A$(X*35+1,X*35+20);"
   (4 SPACES)";A$(X*35+21,X*35+35)
120 NEXT X
```

In this example, though we've wasted what may turn out to be a substantial amount of space by padding the data fields with blanks (lines 60-70) so that they're all the same length, the padding creates a series of easily accessed records that can be edited or (as in lines 100-120) printed out in a formatted fashion without any difficulty. Equally significant is the speed with which the entire file of data can be sent to the disk (or cassette):

```
200 OPEN #1,0,0,"D:NAMEOCCU.DAT"
210 PRINT #1;A$:CLOSE #1
```

In addition, in this instance, even after you have sent the file to the disk, it is still sitting in RAM (in A\$) where it can be manipulated further. You could also combine the two methods, writing each field of data to the disk and putting it into the long string A\$ at the same time.

Note that Atari BASIC provides you with a substantial speed advantage in disk time here over most other microcomputer BASICs inasmuch as it allows strings to be up to 32K long. In other BASICs (for example, Microsoft BASIC on the Atari), the file would have to be saved in an array of strings (or in this case perhaps in two arrays,

THERE'S A COMPUTER BORN EVERY MINUTE... GIVE IT A HOME.

For **\$89.95** with the CS-1632 you can house your computer, peripherals, and accessories without spending a fortune.



The CS-1632 computer storage cabinets compact yet functional design fits almost anywhere while housing your computer monitor, joysticks, software, books and peripherals all for only \$89.95.

The slide out shelf puts the computer at the right height and position for easy comfortable operation.

The fold up locking door keeps unwanted fingers off the key board when not in use.

To store joysticks just turn them upside down and slide them into the mounted storage rack.

Twist tabs on the back of center panel allow for neat concealed grouping of wires, while power packs rest hidden behind center panel on shelf.

The slide out software tray has room for 14 cartridges or cassettes and up to 30 diskettes. Most brands of software will fit between the adjustable partitions with a convenient hook for the space key at rear.

Stand fits Atari 400 & 800, Commodore 64 & VIC 20, TI 99/4A and TRS-80. Cabinet dimensions overall 36" high x 33-7/8" wide x 16" deep.

For those with a large computer family the CS-2748 gives you all the room you need for your computer, monitor, printer, peripherals, software, etc. at a price that's hard to believe: **\$299.95**.



The two slide-out shelves put the keyboard at the proper operating height while allowing easy access to the disk drives.

The bronze tempered glass door protecting the keyboard and disk drives simply lifts up and slides back out of the way during use.

Twist tabs on the back of the center panel allow for neat concealed grouping of wires while a convenient storage shelf for books or other items lies below. The printer sits behind a fold down door that provides a work surface for papers or books while using the keyboard. The lift up top allows easy access to the top and rear of the printer. A slot in the printer shelf allows for center as well as rear feed printers.

Behind the lower door are a top shelf for paper, feeding the printer, and a bottom shelf to receive printer copy as well as additional storage.

Stand fits same computers as the CS-1632 as well as the Apple I and II, IBM PC, Franklin and many others.

The cabinet dimensions overall 39-1/2" high x 49" wide x 27" deep.

Keyboard shelf 20" deep x 26" wide. Disk drive shelf 15-3/4" deep x 26" wide. Top shelf for monitor 17" deep x 27" wide. Printer shelf 22" deep x 19" wide.



To order CS-1632 send \$89.95 to:

To order CS-2748 send \$299.95 to:

**HYTEC
SYSTEMS**

P.O. Box 446
West Lynn, OR 97068
For Fast Phone Orders Call Toll Free 1-800-547-3100
Inside Oregon Call (503) 635-6667

Name _____
Address _____
City _____ State _____ Zip _____
Quantity _____ CS-1632 Quantity _____ CS-2748
☐ Golden Oak Finish ☐ Natural Walnut Finish

☐ My personal check, cashiers check or money order is enclosed
☐ Bill my VISA # _____ Exp. Date _____
☐ Bill my MasterCard # _____ Exp. Date _____
☐ Please include freight charge on my VISA or MasterCard.

Card Holders Signature _____

Immediate shipment if in stock. If not, allow 3-4 weeks for delivery. If personal check a sent allow additional 2 weeks. CS-1632 ships UPS freight collect from Oregon. CS-2748 ships by truck freight collect from Oregon. Prices subject to change. Shipment subject to availability.

Both the CS-1632 and CS-2748 ship unassembled in two cartons. Assembly requires only a screwdriver, hammer, and a few minutes of your time. Choice in simulated woodgrain of warm golden oak or rich natural walnut finish.



**HYTEC
SYSTEMS**

NAME\$(), and OCC\$() , and the save to the disk would have to be done in a significantly slower FOR/NEXT loop:

```
10 FOR X=1 TO ARRAYSIZE
20 PRINT #1,NAME$(X)
30 PRINT #1,OCC$(X)
40 NEXT X
```

Data Retrieval By INPUT

While creating and writing data files is a relatively straightforward procedure, reading the files is by no means as simple, or, in many cases, as rapid. The easiest way in BASIC to read such files is to use the INPUT statement. This would work very well on the data file created in Program 1. Indeed it is a simple matter to read in the data, pad each field with blanks, and put it all into a long string as in Program 3.

Program 3: Reading Data With INPUT

```
10 DIM NAME$(20), OCC$(15), A$(10000)
20 OPEN #1,4,0,"D:\NAMEOCCU.DAT"
30 TRAP 200
40 INPUT #1,NAME$:INPUT #1,OCC$
50 IF LEN(NAME$)<20 THEN NAME$(LEN(NAME$)+1)=" ":GOTO 50
60 IF LEN(OCC$)<15 THEN OCC$(LEN(OCC$)+1)=" ":GOTO 60
70 A$(LEN(A$)+1)=NAME$:A$(LEN(A$)+1)=OCC$:GOTO 40
200 CLOSE #1
```

INPUT in Atari BASIC is relatively problematic. Unlike most BASICs, you can use it easily even if the data contains commas or colons which would signal end of field to the INPUT statement of other BASICs (that is, it really works more like the LINPUT/LINE INPUT available in some dialects).

The problem with the INPUT statement is that it can be used only when there is a carriage return character (ATASCH 155) in the file after every line of text. The file created by Program 1 has such carriage returns embedded in it automatically because every PRINT statement (not followed by a semicolon or comma) automatically attaches a carriage return to the data. This is the reason we had to embed a CHR\$(155) in our data in line 60 of Program 1. Alternatively, we could have written ?#1;NAME\$:?#1;OCC\$.

In Program 2 we do not have carriage returns embedded in the data. The normal way to retrieve such files in BASIC is to use the GET statement, which retrieves one character at a time:

```
10 DIM A$(10000)
20 OPEN #1,4,0,"D:\NAMEOCCU.DAT"
30 TRAP 200:REM to catch the "end of file" error
40 GET #1,X:A$(LEN(A$)+1)=CHR$(X):GOTO 40
200 CLOSE #1
```

The problem with this procedure is that it is inordinately slow, much slower than using INPUT,

and INPUT itself doesn't even come close to the speed of data access that the disk drive is capable of providing. In this particular case we could revise Program 2 by inserting a CHR\$(155) after every field in the storage string A\$, then we could use INPUT to retrieve it.

Reading Files Of Unknown Length

There are many kinds of data in which carriage return characters might not only be inappropriate but also might be found within data fields themselves, so that INPUT could not be used. Reading in a segment of machine language or the data for a graphics display would be two common examples. Some computers provide an easy way to directly and quickly store and retrieve chunks of RAM memory, such as the commands BSAVE and BLOAD in Applesoft.

Experienced users realize that the Atari operating system supports such operations, but even with them, the user must declare in advance the exact length of the file to be transferred.

The challenge is to find a simple routine that will read a file from disk into memory at maximum speed, even though we don't know in advance how long the file is. Simply knowing that we have reached end-of-file is not enough. Let us say, for example, that we have provided a 10,000-character block of memory (DIM A\$(10000)) in which to store our file. How do we know how far into that memory block the file has reached? No problem. It turns out that the operating system keeps track for us, in RAM locations 40 and 41, of exactly how many bytes are transferred during a Central Input/Output (CIO) operation.

The following routine, then, can be ENTERed into any BASIC program to initialize a string (FAST\$) containing machine language which allows us optimum-speed file access:

```
30000 RESTORE 30001:FOR I=1 TO 39:RE
AD A:FAST$(LEN(FAST$)+1)=CHR$(
A):NEXT I:GOTO 10
30001 DATA 104,104,104,104,10,10,10,1
70,169,7,157,66,3,104,157,69,3
,104,157,68,3,104,157,73,3
30002 DATA 104,157,72,3,32,86,228,13
2,212,160,0,132,213,96
```

In order to use this routine, you need only open the file normally in BASIC and do a USR function call:

Y=USR(ADR(FAST\$),CHANNEL,ADR(A\$),BSIZE)

where Y is the status returned by the CIO call, CHANNEL is the channel number that you have assigned to this file in your OPEN statement, A\$ is the buffer string into which the file will be read, and BSIZE is the maximum length of that buffer (normally the value to which you have DIMensioned A\$). Using this procedure on a file of 10,000 characters, it takes only 14 seconds (9 if you have double density) to read the file into RAM. This is

New



Books & Software

BOOKS FOR ATARI 400/800XL/800XL/1200XL
ATARI BASIC - Learning by Using
 An excellent book for the beginner. Merry short programs and learning exercises. All important features of the ATARI computers are described (screen drawings, special sounds, keys, paddles, joysticks, specialized screen routines, graphics, sound applications, perfs, ports, and special stuff).
 Order No. 164 \$7.95

Games for the ATARI Computer
 This book describes advanced programming techniques like player-missile-grabbers and use of the hardware registers. Contains many ready to run programs in BASIC and one called GUNFIGHT in machine language.
 Order No. 162 \$7.95

How to program your ATARI in 6502 Machine Language
 Introduction to machine language for the BASIC programmer.
 Order No. 169 \$9.95

ORTH on the ATARI - Learning by Using
 Introduction, programs, applications, learning exercises.
 Order No. 170 \$7.95

All programs from book No. 170 on disk
 Order No. 7319 \$22.00 only!

A Look into the Future-ASTROLOGY
 on your ATARI 800. How to calculate your own horoscope - including letting of the program.
 Order No. 171 \$9.95

HACKER'S GUIDE for your Atari computer
 Tips/tricks-Very important subroutines in 6502 machine language. How to make bootstrap cassette, disks, and EPROMs. Complete construction article and software on how to build an EPROM burner.
 Order No. 172 \$9.95

SMALL BUSINESS SOFTWARE FOR ALL ATARI COMPUTERS
 SUPERMAIL (500 addresses on 1 disk) Completely written in FORTH. Comes on autoboot disk. No cartridge, no ROMs, no FORTH language required.
 Order No. 7312 \$40.00

SUPERINVENTORY (1000 items p.disk)
 Completely written in FORTH. Same as above. (Disk only).
 Order No. 7313 \$40.00

BUSIMAC-1 (written in FORTH). Complete order, inventory, mailing and invoicing. (Disk only).
 Order No. 7313 \$98.00

Microcomputer Hardware Handbook
 Order No. 29 \$14.95

ATCASH
 Convert your ATARI 800 into a powerful cash register. (Disk only).
 Order No. 7303 \$49.95

Increasing program in BASIC
 Order No. 7201 (C) \$29.95
 Order No. 7203 (C) \$39.95

Making Like BASIC
 Order No. 7212 (C) \$19.95
 Order No. 7213 (C) \$24.95

Inventory control in BASIC
 Order No. 7214 (C) \$19.95
 Order No. 7215 (C) \$24.95

SOFTWARE IN MACHINE LANGUAGE FOR ATARI
ATMOMA-1
 Machine language Monitor.
 Order No. 7022 (C) \$19.95

ATMOMA-2
 This is a tracer (debugger) that lets you explore the ATARI RAM/ROM area. You can stop at previously selected address, opcode, or operand. Also very valuable in understanding the microprocessor. At each stop, all registers of the CPU may be changed. Includes ATMOMA-1.
 Order No. 7049 cassette \$49.95
 Order No. 7050 disk \$54.00

ATMAS
 Macro-Assembler for ATARI-800/800XL. One of the most powerful editor assemblers on the market. Versatile editor with scrolling. Up to 17% of source-code. Very fast, translates 8K source-code in about 5 seconds. Source code can be saved on disk or cassette. (Intel Atanome-1).
 Order No. 7099 disk \$39.00
 Order No. 7099 cartridge \$129.00

ATMAS APPLICATION DISK
 All programs and machine language subroutines from Book No.169 on disk.
 Order No. 7311 \$20.00

ATAS
 Same as ATMAS but without macro-capability (320K and 49K RAM).
 Order No. 7098 \$49.95

TEXT-1
 This wordprocessor is an excellent buy for your money. It features seven oriented editing, searching, string search (even nested), left and right margin justification. Over 30 commands. Text can be saved on disk or cassette.
 Order No. 7210 cassette \$29.95
 Order No. 7216 disk \$34.95
 Order No. 7217 cartridge \$69.00

FORTH for the ATARI
 FORTH from ELCOMP PUBLISHING, Inc. is an extended Pig-Forth version, Editor and I/O package included. Utility package includes decompiler, vector copy, Hex dump (ASCII), ATARI filehandling, total graphics and sound, joystick program and player music. Extremely powerful!
 Order No. 7050 (H) reg. \$99.00 sale \$89.95
 Floating point package with trigonometric functions (B - 90°).
 Order No. 7239 disk \$29.95

Lessons FORTH
 A subset of Pig-Forth for the beginner. On disk (32K RAM) or case. (16K RAM).
 Order No. 7052 reg. \$9.00 sale \$19.95

HARDWARE ADD-ONS for ATARI

PRINTER INTERFACE
 This construction article comes with printed circuit board and software. You can use the EPSON printer without the ATARI printer interface. (Works with gamesport 2 and 4).
 Order No. 7211 \$19.95

3850 Serial interface (RS232C-5V)
 Software with connector and construction article.
 Order No. 7291 \$19.95

EPROM BURNER for ATARI 400/800
 KIT. Printed circuit board and software and extensive construction article.
 Order No. 7292 \$49.00

EPROM BOARD (CART/RIDGE)
 Holds two 4K EPROMs (2501). EPROMs not included.
 Order No. 7043 \$29.95

EPROM BOARD KIT
 Same as above but with board only with description.
 Order No. 7234 \$14.95

Assembly and Disassembly for ATARI
 Order-No. 7223 disk \$29.95

Birth control with the Atari (Kasas Ogden)
 Order No. 7222 disk only \$29.95

THE APPLE in your hand. BRAUN New!
 Book includes introduction to 6502 Machine Language and FORTH, BASIC programs never published before!
 Order No. 178 (500 pages) \$12.95

CP/M - MBASIC and the OSBORNE computer
 Business Applications, control, listings of mailing list, database, inventory, invoicing and more.
 Order-No. 177 \$9.95

SUPERBOOKS 1 the Commodore 64 BLIZTEXT! - The best wordprocessor for the C-64 in the whole universe. Includes terminal software for electronic mail.
 Order No. 4965 162 pages manual \$69.00

MACROFIRE - Editor/Assembler for the C-64
 The best macroassembler you can buy!
 Order No. 4963 \$69.00

SUPERBOOKS for your C-64
 The Great Book of Games, Vol. I
 64 programs for the Commodore-64.
 Order No. 162 \$9.95

Programs from this book on disk \$19.95
MORE ON THE SIXTYFOUR
 Tips, tricks, hints, very important subroutines.
 Order No. 162 \$9.95

Programs from this book on disk \$19.95
How to program in 6502 Machine Language on your C-64
 Order No. 169 \$12.95

Commodore-64 Tune-ups, Vol. I
 How to program in 6502 Machine Language on your C-64.
 Order No. 165 \$12.95

Small Business Programs for the C-64
 Order No. 166 \$12.95

HARDWARE ADD-ONS for your C-64
 Parallel printer interface, KIT
 Order No. 4950 \$19.95

Universal Experimentor Board
 Order No. 4970 \$9.95

Expansion Board (holds 4 exp. boards)
 Order No. 4992 \$29.95

BOOKS, SOFTWARE, ADD-ONS for VIC-20, APPLE II, OSBORNE, TIMEX + OSI computers
 Tricks for Vics (500K)
 Order No. 176 \$9.95

Universal Experiment-board for the VIC-20
 (Save money with this great board). This board plugs right into the expansion slot of the VIC-20.
 Order No. 4044 reg. \$19.95 sale \$9.95

Programming in BASIC and machine language on the ZX-81 (82) TIMEX1000
 Order No. 174 (book) \$9.95

The Custom APPLE + Other Mysteries
 A complete guide to customizing the APPLE software and hardware.
 Order No. 880 \$24.95

We also stock the boards which are used in the book No. 695 (boards)

UNFACKER

Elcomp Publishing, Inc. 53 Redrock Lane, Pomona CA 91766, Phone: (714) 623-8314, Telex: 29 81 91

PAYMENT: Check, money order, VISA, MASTER CARD, Express-ACCESS, letters.
 Please order all \$2.50 for shipping (USA).
 All orders outside USA add 15% shipping. California residents add 6.5% sales tax.

ComputAbility™

Your ATARI Discount Software Store That's As Close As Your Phone!!

ATARI 800/48KCALL

ATARI 800XL 64K	CALL
ATARI 810 DISK DRIVE	CALL
ATARI 1050 DISK DRIVE	CALL
ATARI 850 INTERFACE	CALL
ATARI 1010 RECORDER	77.00
HOME MANAGER KIT	61.95
ATARI 1027 PRINTER	289.00

MOSAIC

64K Ram/400	149.00
64K Ram + Cable Kit /400/800	169.00
48K Ram Kit	94.00
16/32 Expander	64.95
32K Ram	77.95
Mosaic Adaptor	9.95
64K Ram Utility Software	
Superdrive & Handyman	Call!!

Third Party Printer Interface
Call for Price and Availability

PRINTERS

PROWRITER 8510 AP .. CALL

Axiom AT-100

w/Parallel PortCALL

DISK DRIVES: PERCOM, RANA, TRAK, ASTRA CALL FOR PRICES.

SUPER SPECIALS

JUMPMAN	DEADLINE	WAYOUT	POOYAN	MINER 2049'ER	BANDITS
DISK/TAPE \$26.95	DISK \$33.95	DISK \$26.95	DISK/TAPE \$19.95	CARTRIDGE \$33.95	DISK \$22.95

EFFECTIVE NOW THROUGH NOVEMBER 30, 1983

FREE* SOFTWARE AND ACCESSORIES

ATARI

Conversational Languages-T	43.95
Programming 2 & 3 - T	21.95
Music Composer - C	32.95
My First Alphabet - D	28.95
Touch Typing - T	19.95
Home Filing Manager - D	37.95
Mailing List - T	19.95
Asteroids - C	26.95
Caverns Of Mars - D	28.95
Computer Chess - C	24.95
Missile Command - C	26.95
Super Breakout - C	26.95
Star Raiders - C	32.95
Assembly Editor - C	44.95
Basic - C	39.95
Microassembler - D	65.95
Microsoft Basic - D	65.95
Pilot (Home Packaging) - C	29.95
Invitation To Programming-I-T	18.95
Speed Reading - T	65.95
Basketball - C	26.95
Graph II - T	15.95
Juggles House - D/T	22.95
Pilot Educator - C	97.95
Video Easel - C	26.95
Defender - C	32.95
Odyssey - C	74.95
Dix - C	32.95
Dig Dug - C	32.95
ET - C	37.95
Timepiece - D	23.95
Atariwrest - C	74.95
Donkey Kong - C	37.95
Ms Pac-Man - C	39.95
Tennis - C	35.95
Expans Front - C	39.95
Donkey Kong Jr. - C	39.95
Pengo - C	35.95
Logo - C	79.95
Robtson - C	35.95
Pro Position - C	39.95
Microsoft Basic II - C	65.95
Paint - D	33.95
Caverns Of Mars - C	32.95

FIRST STAR

Astro Chase	23.95
Blaster - D/T	23.95
Fire Flip - D/T	23.95
Pro Position - D/T	23.95

INFOCOM

Call for items & prices

COMPUTABILITY DIVIDEND COUPON PREMIUMS

3 1/2 Blank Disk - Box of 10	27.00 or 10 Coupons
Elphint Disk - Box of 10	22.00 or 8 Coupons
Zip 'n' File Disk Holder	20.95 or 6 Coupons
Zip 'n' File Cartridge Holder	20.95 or 6 Coupons
Monitor Stand	27.95 or 10 Coupons
VU - Case Disk Holder W/lock	24.00 or 10 Coupons
Heavy Plastic Dust Cover 800 or 810	9.95 or 3 Coupons
First Book of Atari Software 1983	17.95 or 6 Coupons
Kids & The Atari	12.95 or 5 Coupons
The Atari Assembler	14.95 or 6 Coupons
Atari Games & Recreation	14.95 or 6 Coupons
Atari Pilot for Beginners	14.95 or 6 Coupons
The Vasculo Book Atari	12.95 or 5 Coupons
Atari Basic	9.95 or 3 Coupons
Atari Sound & Graphics	12.95 or 5 Coupons
Starlighter	9.95 or 3 Coupons
Six Sisk	9.95 or 3 Coupons
Extension Cable - 6 ft.	9.95 or 3 Coupons
Lefty Adaptor	9.95 or 3 Coupons
Sisk Stand	9.95 or 3 Coupons
Surcom Tag II	19.95 or 8 Coupons
Surcom Game Switch	6.95 or 3 Coupons
Ti Adaptor	12.95 or 5 Coupons
Kraft Switch Hitter Joystick	17.95 or 7 Coupons
Kraft Joystick	15.95 or 6 Coupons
Mouse II 2 Pick Disks	9.95 or 3 Coupons
Inside Atari Basic	12.95 or 5 Coupons
Computer's First Book of Atari	12.95 or 5 Coupons
Computer's Second Book of Atari	12.95 or 5 Coupons
De Re Atari	17.95 or 6 Coupons
Wico Joystick	24.00 or 10 Coupons
\$24.00 Worth of Software	10 Coupons

*COUPON PROGRAM

The purchase of each program (with the exception of Super Specials, Atari and APX) will earn you 1 COMPUTABILITY DIVIDEND COUPON. Save 10 coupons and redeem them for your choice of any program we sell for \$24.00 or less. (Less than 10 coupons may be redeemed for premium items as indicated. You pay only a \$2.50 shipping & handling charge.)

DATASOFT

Poooyan - D/T	23.95
Moon Shuttle - D/T	23.95
Sands of Egypt - D	23.95
The Wizard - D	37.95
Spell Wizard - D	37.95
Basic Compiler - D	69.95
Tetris - D	37.95
Canyon Climber - D/T	29.95

SIRIUS

Bands - D	27.95
Way Out - D	31.95
Repton - D	31.95
Yeezus - D	27.95
Blade of Blackpool - D	31.95
Type Attack - D	31.95
Sea Run - D	27.95
Critical Mass - D	31.95

ADVENTURE INTERNATIONAL

Preppie - D/T	23.95
S.A.G.A. Adventures - D	31.95
Sea Dragon - D/T	27.95
Stratos - D/T	27.95
Bugoff - D/T	23.95
Preppie II - D/C	27.95
Stone of Sisyphus - D	31.95
Eliminator - D/T	20.95
Rally Speedway - Cart	37.95
Utopia Disassembler - D	39.95
Osleidy - D	39.95
Trid - D/T	27.95

SYNAPSE

Dimension X - D/T	27.95
Shadow World - D/T	27.95
Rainbow Walker - D/T	27.95
Orbels - D/T	27.95
Shamus II - D/T	27.95
Blus Max - D/T	27.95
Pro Apocalypse - D/T	27.95
Mcromancer - D/T	27.95
Phant's Game - D/T	27.95
Survivor - D/T	27.95

PARKER BROS.

Q-Bert - Cart	34.95
Propper - Cart	34.95
Astro Chase - Cart	34.95
Popeye - Cart	34.95
Tutankhamen - Cart	34.95
Risk - Cart	39.95
Chess - Cart	39.95

MISCELLANEOUS

Night Mission - D/T	23.95
Lover Perfect - D	99.95
Jaxco - D/T	23.95
Castle Wolfenstein - D	23.95
Monkey Wrench II - Cart	49.95
PM Animator - D	27.95
Tetris - D	31.95
Starball Football - D/T	25.50
Dats Perfect - D	79.95
Uthra II - D	44.95
Crash Mountain - D	27.95
Star League Baseball - D/T	25.50
Home Accountant - D	54.95
Orion - D	79.95

D-Disk T-Cassette C-Cartridge

ATARI is a trademark of ATARI, Inc.

We Carry Hundreds of Items for ATARI 400/800, Ask for Our FREE CATALOG.

Mastercard/VISA

Order Toll Free



800-558-0003

No surcharge for credit cards



In Wisc. Call

414/351-2007

COMPUTABILITY
P.O. Box 17882
Milwaukee, WI 53217

ORDERING INFORMATION: To order by mail, send money order, certified check, or personal check (allow 14 days to clear) to COMPUTABILITY. Include \$2.00 shipping on all software orders. Include \$3.00 shipping on all hardware orders. Minimum \$2.50. Mastercard and Visa please include card number and expiration date. WI residents please add 5% sales tax. Canadian, APO & FPO software orders include 5% shipping minimum \$3.00. All other foreign software, please add 15% shipping, minimum \$7.00 (US Funds only). Prices subject to change without notice.

ORDER HOURS

Mon-Fri 12-9 PM (CST)

Sat 12-5 PM (CST)



U-boat

Mark Vittek

"U-boat," for VIC and 64, starts out quietly enough, but don't be lulled into a false sense of security. Without warning, you'll be called upon to use all your wits to save yourself.

"U-boat" is a nice change of pace from fast action, run-and-shoot games – for a while.

As you calmly patrol the ocean floor, the serenity is soon broken by the sudden explosion of a depth charge. Above you, on the ocean surface, are destroyers on a search-and-destroy mission. And if that isn't bad enough, there is a constant supply of mines to keep you busy.

The object of the game is to sink as many ships as possible before their depth charges reach you. On the surface of the sea, destroyers and aircraft carriers pass to and fro dropping their destructive cargo. Some drop randomly, but others zero in on your U-boat.

You can destroy bothersome mines with your torpedoes, but new ones always replace them after five ships have been sunk. So in order to keep your patrol area tidy, you have to take time out every now and then to remove mines. Also, it's important to remember that when the charges and mines explode, they take the surrounding eight cursor spaces with them. If your U-boat is in this area, it is permanently retired.

VIC Version

For those of you who do not have a joystick, Program 3 shows the necessary replacement lines for Program 2 so that you can use the keyboard. I used the cursor keys to move the sub, but if you find that they are too difficult, you may assign new keys in lines 70-76.

If you do have a joystick, you may want to try the keyboard later on. You'll find it more of a challenge because the game plays faster. It may be a bit difficult at first, but if you master the game using the keyboard, you can become the scourge of the seven seas.

U-boat was designed to provide a large variety of objects on the screen without slowing the game down. As most game programmers know, too many POKES and PRINTs can spoil the game's fast action quality. For example, the usual two POKES to location 37154 have been omitted from the joystick reading routine.

Using MID\$ is a good technique for achieving fast movement of many objects on screen. In Program 2, MID\$ was used to move the ships across the screen because it was faster than POKing. Also, when I first wrote the game with POKes, the ship's bow plunged into the sea as the ship wrapped around the screen. This could be remedied with IF statements, but using MID\$ turned out to be faster and easier. Since the number of characters displayed by MID\$ is set at 22 (VIC's screen width), the ship disappears as if it just sailed out of view.

LEFT\$, RIGHT\$, and MID\$ often provide for faster and more clever effects in game programming.

Type in and SAVE Program 1 first. This program will print instructions and redefine the necessary game characters. Reset the computer, then type in and SAVE Program 2 immediately following Program 1 on the same tape.

When you RUN Program 1, it will automatically LOAD and RUN Program 2.

The 64 version plays the same as the VIC version but requires a joystick.



Complete Personal Accountant: we've made the best much more friendly.

If you have any doubts that we offer the best and most complete personal financial package available, look over the features listed below. Now we have the only package with **full screen editing** for Atari 400/800*, TRS-80 COLOR, Commodore 64* and VIC-20; the ability to move the cursor in any direction makes our accountant-designed package even more friendly than before. No one else offers all of these:

1. **CHECKBOOK MAINTENANCE**—automatically balances your checkbook with each entry; manages checks, charges, deposits, and interest quickly and accurately.

2. **CHART OF ACCOUNTS**—maximum of user flexibility with up to 99 accounts plus 9 sub-categories may be defined.

3. **CHECK SEARCH**—multi-reference; tracks items on every field including tax deductibles.

4. **NET WORTH/INCOME/EXPENSE STATEMENT**—know-exactly-where-you-stand

program generates statements with the touch of a key.

5. **DETAIL & SUMMARY BUDGET ANALYSIS**—an absolute necessity in financial planning.

6. **CHECK WRITER**—prints personalized checks**

7. **PAYMENTS/APPOINTMENTS CALENDAR**—monthly displays of up to 250 bills and 200 appointments.

8. **COLOR GRAPH DESIGN PACKAGE**—graphs all monthly files.

9. **MAILING LIST**—maintains all records, sorts by name or zip, allows add/change/delete.

10. **FRIENDLY USER MANUAL**—complete with indexing, flow charts and diagrams; the most thorough documentation on the market.

This all adds up to the finest personal financial system available—comprehensive enough for a small business.

Less than one hour of data input per month will allow this menu-driven package to help you handle your finances with a lot more fun than drudgery.

Plus, ours is the only expandable system; purchase the package in sections and add on

as your financial needs grow. Features 1, 2, 3 and 6:

\$39.95 diskette,

\$36.95 cassette; Features 4 and 5:

\$29.95 diskette, \$26.95 cassette;

Features 7, 8 and 9: \$29.95

diskette, \$26.95 cassette; or

save \$19.90 or \$15.90 respectively by buying the

entire system for \$79.95 diskette, \$74.95 cassette.

**Prints all statements and files
on any 80 column printer**

*Random Access available for disk

**Atari, Commodore 64 and TRS-80 COLOR

Prices subject to change without notice. See your local dealer or order direct. Now catalog available.

Add \$3.00 for postage and handling. Credit card orders call toll free:

1-800-334-SOFT

DEALER INQUIRIES INVITED

programmer's institute

a division of **FUTUREHOUSE, INC.**

p.o. box 3470, dept. C, chapel hill, north carolina 27514, 919-967-0861

Program 4: U-boat – VIC Version (Instructions And Loader)

BEGINNING PROGRAMMERS

If you're new to computing, please read "How To Type COMPUTE!'s Programs" and "A Beginner's Guide To Typing In Programs."

```

5 PRINT "[CLR][6 DOWN][BLU]{RVS}
  [8 SPACES]U-BOAT[8 SPACES]"
10 X=28:POKE52,X:POKE56,X:POKE51,PEEK(55)
20 FORI=7168TO7679:POKEI,PEEK(I+25600):NEXT
  XT
30 READ:IFT=-1THEN50
40 POKE7168+Q,T:Q=Q+1:POKE36879,T:GOTO30
50 POKE36879,28:PRINT"[3 DOWN] INSTRUCTIO
  NS? (Y/N)"
55 PORT=1TO1000:GETAS:IFAS="N"THEN1000
60 IFAS="Y"THEN1000:NEXT:GOTO100
65 NEXT:GOTO150
100 PRINT"[CLR][DOWN] FIRE TORPEDOES FROM
  [3 SPACES]THE SUB'S FRONT[2 SPACES]TO
  [3 SPACES]SINK SHIPS AND "
105 PRINT" DESTROY MINES."
110 PRINT"[DOWN] BEWARE OF THE DEPTH
  [3 SPACES]CHARGES AND MINES[5 SPACES]
  DESTRUCTIVE AREA "
115 PRINT" WHEN THEY EXPLODE."
120 PRINT"[DOWN] DESTROY AS MANY SHIPS AS
  YOU CAN UNTIL YOU[2 SPACES]ARE PERMA
  NENTLY[7 SPACES]RETIRED."
125 PORT=1TO5000:NEXT:PRINT"[3 DOWN]{RVS}
  PRESS ANY KEY
130 GETAS:IFAS=" "THEN130
140 REM THE NEXT LINE[2 SPACES]WILL NEW T
  HE PROGRAM. DO NOT PUT IT IN WHEN TES
  TING[2 SPACES]PROGRAM.
150 PRINT"[CLR]":POKE198,5:PORT=631TO635:
  READX:POKET,X:NEXT
1000 DATA182,193,213,128,201,193,182,255,
  255,159,159,159,243,243,243,255,,,,,
  255,181,63
1002 DATA31,,96,112,252,255,148,255,255,,
  14,30,127,255,145,255,255,,,,,255,16
  6,252,248
1004 DATA,,4,4,15,10,127,63,,192,196,200,
  208,224,255,254
1006 DATA,3,35,19,11,7,255,127,,,32,32,24
  0,80,254,252,254,254,252,252,,133,20
  8,224
1008 DATA255,255,127,63,,80,3,31,255,255,
  254,254,,10,192,248
1010 DATA127,127,63,63,,161,11,7,255,239,
  239,239,239,199,215,255,65,41,68,175
  ,122,189
1012 DATA110,219,17,74,148,125,218,180,22
  1,182,255,255,255,255,255,255,255,25
  5
1014 DATA191,213,187,92,171,237,198,219,2
  47,174,181,125,235,189,173,222
1016 DATA-1,78,69,87,13,131

```

Program 2: U-boat – VIC Version (Main Program)

```

0 GOTO600
50 PA=PEEK(37152)AND128:P=PEEK(37151):IF-
  ((PAND32)=0)ORLTHENGOSUB150
70 IF-(PA=0)THENAY=AY+1:X=12:IFAY>20THENA

```

```

Y=AY-1
72 IF-(PAND16)=0)THENAY=AY-1:X=10:IFAY<0
  THENAY=AY+1
74 IF-(PAND8)=0)THENAX=AX+22:IFAX>198THE
  NAX=AX-22
76 IF-(PAND4)=0)THENAX=AX-22:IFAX<-22THE
  NAX=AX+22
80 A=AX+AY+7900:P=PEEK(A):P0=PEEK(A+1):PO
  KEA1,17:POKEA1+1,17:POKEA,X:POKEA+1,X+
  1:A1=A
82 IFP<20RPO<2THEN400
84 LM=LM+1:IFLM<RRTHEN92
86 N1=N1+22:CO=PEEK(N1):IFN1=AORN1=A+1THE
  NPOKEN1-22,17:GOTO400
88 IFN1>AORCO<3THEN300
90 POKEN1-22,17:POKEN1,1
92 IFM>VTHEN:PRINT"[HOME]{BLK}[7 DOWN]"MI
  DS(AS(TT),H,22):H=H+M2:IFH=H1THENM=0:
  H=1
94 M=M+1:IFM<VTHEN50
96 IFM=VTHEN100
98 GOTO50
100 LM=0:N1=7856+AY:T=(RND(1)*6)+1:ONTGOT
  O110,109,106,104
102 TT=(RND(1)*2)+1:H=2:H1=26:M2=1:RR=22-
  (LM+AY):GOTO94
104 TT=(RND(1)*2)+3:H=26:H1=2:M2=-2:RR=-
  (LM-AY)/2:GOTO94
106 TT=(RND(1)*2)+3:H=26:H1=2:M2=-2:T=RND
  (1)*19:N1=7856+T:RR=3-(LM-T)/2:GOTO94
108 TT=4:H=28:H1=2:M2=-1:T=RND(1)*19:N1=7
  858+T:RR=3-(LM-T):GOTO94
110 TT=2:H=22:H1=26:M2=1:T=RND(1)*20:N1=78
  56+T:RR=22-(LM+T):GOTO94
150 L=L+1:IFL<2THENC=A:IFX=12THENC=A+1
152 C=C+22:CO=PEEK(C):IFCO<17THEN160
154 IPC<7856THENPOKEC+22,17:L=0:RETURN
156 POKEC+22,17:POKEC,14:RETURN
160 ONCO+1GOTO162,162:GOTO180
162 POKEZZ-2,(RND(1)*50)+155:PORT=-1TO1:P
  ORI=-1TO1:POKEZZ-1,10-T-I:C1=PEEK(C+I
  +T*22)
164 IFC1=1THENRR=99:LM=0
168 IFC1>9ANDC1<14THENM1=1
169 L=0:POKEC+I+T*22,(RND(1)*2)+18:NEXTI,
  T:POKEZZ-2,0:IFM1=1THEN400
170 PORT=-1TO1:FORI=-1TO1:POKEC+I+T*22,17
  :NEXTI,T:RETURN
180 PRINT"[HOME]{PUR}[7 DOWN]"MIDS(AS(0),
  H,22):POKEC+22,17:POKEC-22,32:POKEZZ-
  2,(RND(1)*100)+140
182 PORT=15TO8STEP-.09:POKEZZ-1,T:NEXT:PR
  INT"[HOME]{7 DOWN}[22 SPACES]";
184 M=0:L=0:IFCO<7THENBS=BS+1
186 IFCO>6THENMS=MS+1
188 IFLM<RRTHENRR=99
190 IFMS+BS=5THENPOKEZZ,248:V=20
192 IFMS+BS=15THENPOKEZZ,232:V=10
194 IFMS+BS=30THENPOKEZZ,204
196 IF(MS+BS)/5=INT((MS+BS)/5)THENPORT=1T
  O8:POKE7878+(RND(1)*197),0:NEXT:J=1
198 IFJ=1THENFORT=-1TO2:FORI=-1TO1:POKEA+
  T+I*22,17:NEXTI,T:J=0
200 RETURN
300 J=15:RR=99:ML=0:POKEZZ-2,(RND(1)*30)+
  128:PORT=-1TO1:FORI=-1TO1:C1=PEEK(N1+
  I+T*22)
302 POKEZZ-1,J:J=J-1.6:IFC1=14THENL=0
304 IFC1>9ANDC1<14THENM1=1
306 POKEN1+I+T*22,(RND(1)*2)+18:NEXTI,T:P
  OKEZZ-2,0:IFM1=1THEN400

```



```

308 FORT=-1TO1:FORI=-1TO1:POKEN1+I+T*22,1
7:NEXTI,T:GOTO92
309 POKEN1+I+T*22,(RND(1)*2)+18:NEXTI,T:P
OKEZZ-2,0:IFM1=1THEN400
400 POKEZZ-1,15:POKEA,15:POKEA+1,16
402 FORT=-1TO16STEP-.15:POKEZZ-2,255-T*5:PO
KEZZ,T*11:NEXT:POKEZZ-5,0
404 FORT=15TO8STEP-.2:POKEA,(RND(1)*2)+18
:POKEA+1,(RND(1)*2)+18
406 POKEZZ-1,T:NEXT:POKEZZ-2,0:POKEZZ-10,
240:POKEZZ,221:PRINT"[CLR][BLK][DOWN]
YOU SANK"BS"CARRIERS"
408 PRINT"[DOWN]AND"MS"DESTROYERS":FORT=1
TO2000:NEXT
410 PRINT"[3 DOWN] PLAY AGAIN ?":PRINT"
[RV$][DOWN] UP=YES DOWN=NO"
412 IF-(PEEK(37151)AND4)=0:THENRND
414 IF-(PEEK(37151)AND8)=0:THENPOKE37154
,255:PRINT"[CLR] SO LONG."END
416 GOTO412
600 ZZ=36879:POKEZZ,24:POKEZZ-10,255:POKE
ZZ-1,15:POKE37154,127:X=10:V=30:AX=19
8:AY=10
602 RR=30:H=2:PRINT"[CLR][BLK][RV$]
[5 SPACES]U-BOAT[3 SPACES]26
[7 SPACES][OFF]"CHR$(8);
604 A$(1)="[21 SPACES]BDE[3 SPACES]":A$(2)
="[21 SPACES]PG[3 SPACES]"
606 A$(3)="[25 SPACES]BCDE":A$(4)="
[25 SPACES]HI "
608 A$(0)="[22 SPACES]OPOP "
610 FORT=1TO4:PRINT"[YEL]QQQQQQQQQQQQQQQQ
QQQQQQQ";NEXT:PRINT"[3 DOWN]";FORT=1
TO12
612 PRINT"[BLU]QQQQQQQQQQQQQQQQQQQQQQQ";N
EXT
614 FORT=8128TO8186:POKET,17:POKE30720+T,
0:NEXT:FORT=1TO15:POKE878+ (RND(1)*19
7),0
618 NEXT:POKE8100,17:POKE8109,17:GOTO50

```

Program 3: U-boat - VIC Version (Replacement Lines For Keyboard Control)

```

50 GETA$:IFA$=" ORLTHENGOSUB150
70 IFA$={RIGHT}"THENAY=AY+1:X=12:IFAY>20
THENAY=AY-1
72 IFA$={LEFT}"THENAY=AY-1:X=10:IFAY<0TH
ENAY=AY+1
74 IFA$={DOWN}"THENAX=AX+22:IFAX>198THEN
AX=AX-22
76 IFA$={UP}"THENAX=AX-22:IFAX<-22THENAX
=AX+22

```

Program 4: U-boat - 64 Version

```

100 POKE55,0:POKE56,48:CLR:PRINT"[CLR]"CH
R$(8):GOTO800
110 :
120 FORT=0TO27:POKEI+54272,0:NEXT
130 POKE54296,15:POKE54272,100:POKE54273,
5:POKE54277,0:POKE54278,249
140 POKE54279,100:POKE54280,2:POKE54284,0
:POKE54285,249
150 POKE54291,0:POKE54292,249:M=V:GOTO340
160 :
170 MV=1:P=PEEK(56328):IFP=127THENMV=0
180 IF(PAND16)=0ORLTHENGOSUB420
190 IF(PAND8)=0THENAY=AY+1:X=12:IFAY>38TH
ENAY=AY-1
200 IF(PAND4)=0THENAY=AY-1:X=10:IFAY<0THE
NAY=AY+1
210 IF(PAND2)=0THENAX=AX+40:IFAX>360THENA
X=AX-40
220 IF(PAND1)=0THENAX=AX-40:IFAX<-80THENA
X=AX+40
230 A=AX+AY+1424:P=PEEK(A):P0=PEEK(A+1):I
FMVTHENPOKEA,17:POKEA+1,17
240 POKEA,X:POKEA+1,X+1:A1=A
250 IFP<20RPO<2THEN760
260 LM=LM+1:IFLM<RRTHEN300
270 NI=NI+40:CO=PEEK(NI):IFNI=AORNI=A+1TH
ENPOKEN1-40,17:GOTO760
280 IPN1=AORCO<3THEN360
290 POKEN1-40,17:POKEN1,1
300 IFM>VTHENPRINT"[HOME][BLK][7 DOWN]"MI
D$(A$(TT),H,40);:H=H+M2:IFH>H1THENM=0
:H=1
310 M=M+1:IFM=VTHEN340
320 GOTO170
330 :
340 LM=0:NI=1344+AY:T=RND(1)*6+1:ONTGOTO3
90,380,370,360
350 TT=RND(1)*2+1:H=2:H1=44:M2=1:RR=40-(L
M+AY):GOTO310
360 TT=RND(1)*2+3:H=44:H1=2:M2=-2:RR=-(LM
-AY)/2:GOTO310
370 TT=RND(1)*2+3:H=46:H1=2:M2=-2:T=RND(1)
*37:NI=1344+T:RR=3-(LM-T)/2:GOTO310
380 TT=4:H=46:H1=2:M2=-1:T=RND(1)*37:NI=1
344+T:RR=3-(LM-T):GOTO310
390 TT=2:H=2:H1=44:M2=1:T=RND(1)*38:NI=13
44+T:RR=40-(LM+T):GOTO310
400 :
410 REM TORP MOVE
420 L=L+1:IFL<2THENC=A:IFX=12THENC=A+1
430 C=C-40:CO=PEEK(C):IFCO<17THEN460
440 POKEC+40,17:IFC<1344THENL=0:RETURN
450 POKEC,14:RETURN
460 IFCO<>0ANDCO<>1THEN540
470 POKE54276,129:POKE54276,128
480 FORT=-1TO1:FORI=-1TO1:C1=PEEK(C+I+T*4
0)
490 IPC1=1THENRR=99:LM=0
500 IPC1>9ANDC1<14THENM1=1
510 L=0:POKEC+I+T*40,(RND(1)*2)+18:NEXT:N
EXT:IFM1=1THEN760
520 FORT=-1TO1:FORI=-1TO1:POKEC+I+T*40,17
:NEXT:NEXT:RETURN
530 :
540 PRINT"[HOME][PUR][7 DOWN]"MID$(A$(0),
H,40):POKEC+40,17:POKEC-40,32
550 POKE54276,129:POKE54276,128
560 FORT=1TO100:NEXT
570 PRINT"[WHT][HOME][7 DOWN][40 SPACES]"
:
580 M=0:L=0:IFCO<7THENBS=BS+1
590 IFCO>6THENMS=MS+1
600 IFLM<RRTHENRR=99
610 IFMS+BS=5THENPOKE53281,7:V=20
620 IFMS+BS=15THENPOKE53281,14:V=10
630 IFMS+BS=30THENPOKE53281,10
640 IF(MS+BS)/5=INT((MS+BS)/5)THENFORT=1T
O8:POKE1384+(RND(1)*359),0:NEXT:J=1
650 IFJ=1THENFORT=-1TO2:FORI=-1TO1:POKEA+
T+I*40,17:NEXT:NEXT:J=0
660 RETURN
670 :
680 RR=99:ML=0:POKE54283,129:POKE54283,12
8
690 FORT=-1TO1:FORI=-1TO1:C1=PEEK(NI+I+T*
40)

```

YORK 10 CASSETTES DISKETTES



**NEW!
LOWER PRICES
LONGER LENGTHS**

DATA TRAC / C-06, C-12, C-24

From the leading supplier of Computer Grade Cassettes, new, longer length C-12's (6 minutes per side) provide the extra few feet needed for some 16K programs.



Premium 5-screw shell with leader — BASF tape



Internationally acclaimed. Thousands of repeat users.



Error Free • Money back Guarantee

	C-06	C-12	C-24	HARD BOX
1 Dozen	7.00	7.50	9.00	2.50
2 Dozen	13.00	14.00	17.00	4.00



500 C-12's—38¢ each. * when shipping \$17.50 add \$4

500 Boxes 13¢ ea. + shipping \$10.50



**TRACTOR FEED • DIE-CUT
BLANK CASSETTE LABELS**
\$3.00/100 \$20.00/1000

CASSETTE STORAGE CADDY

Holds 12 cassettes w/o boxes
includes edge labels
and index card

\$2.95



BASF QUALIMETRIC



FLEXI-DISC
5 1/4" SS000, Soft Sect.
Lifetime warranty!



\$26.95/10 \$120.00/50 \$215.00/100

MICRO CASSETTES

in convenient short lengths

	MC-10	MC-20	MC-30
1 Doz.	16.50	18.00	19.00
2 Doz.	32.50	34.50	36.00

Fits Epson
and Sharp
micro drives



Same superior tape in
premium shell with
handles. Includes box

SHIPPING/HANDLING \$3.50

Any quantity (except 500 special)

NOTE: Outside 48 Contins. States shipping
\$3.50 PLUS \$1 per caddy per dozen cas-
settes, per dozen boxes, per 10 discs

In Calif. (U.S. shipments are by UPS
unless Parcel Post requested)

California residents add Sales Tax

**WRITE FOR FREE BROCHURE
ASK FOR QUANTITY DISCOUNTS**
for IMMEDIATE SHIPMENT
on Credit Card Orders

Call: 213/700-0330

YORK 10 Computerware
5625 Visser Ave. #CM Chatsworth, CA 91311

NEW! Universal Input/Output Board for VIC-20/64



16-channel A/D conver-
ter & 1-channel D/A output; 16 high-cur-
rent discrete outputs.

• University physics & electrical en-
gineering labs and hospital applica-
tions.

VIC-20 uses MW-311V \$205.00

CBM-64 uses MW-311C \$225.00

MW-302: VIC-20/64 Parallel Printer Interface.



Works with all centronics type parallel
matrix & letter printers and plotters—
Epson, C.Itoh, Okidata, Nec, Gemini
10, TP-I Smith Corona, and most
others. Hardware driven; works off the
serial port. Quality construction: Steel
DIN connectors & shielded cables. Has
these switch selectable options: Device
4, 5, 6 or 7; ASCII or PET ASCII; 7-bit
or 8-bit output; upper & lower case or
upper only. Recommended by PRO-
FESSIONAL SOFTWARE for WordPro
3 Plus for the 64, and by City Software
for PaperClip.

MW-302 \$ 79.95

Dealer
inquiries invited.



Micro World Electronics, Inc.
3333 S. Wadsworth Blvd. #C105,
Lakewood, CO 80227
(303) 987-9532 or 987-2671

**No Matter What
Type of Computer
You Own,
This Book Will Get
You On-Line
TODAY!**

HOOKING IN THE UNDERGROUND BULLETIN BOARD WORKBOOK AND GUIDE

**FIRST TIME BETWEEN TWO COVERS
'83 - '84 EDITION**
[Periodic Updates]
INCLUDING: A Blitz Course In TeleCom-
puting, Complete Information On Com-
puter Bulletin Boarding with Special Em-
phasis on **Public Domain Systems:**

- What They Are.
- Kinds of Information Available.
- How To Get Yours Free.
- Step-by-Step Guide
To Get Your Started
HOOKING IN Immediately.
- Buyers' Guide To Moderns.

PLUS: Over 400 verified listings.
Periodic Updates. On-line Logbook.
Electronic Mail Address Book.

\$14.95 p.p. Make checks payable to:

ComputerFood Press DIV OF COLTRANE & BEACH

31754 Foxfield Drive
Westlake Village, CA 91361
Phone Number: (213) 462-0888

Please Send _____ copies.

Enclosed is \$

NAME _____

ADDR. _____

CITY _____

STATE _____

CARD # _____

Signature _____

Send To:

ComputerFood Press DIV OF COLTRANE & BEACH

P.O. BOX 6249
Westlake Village, CA 91359
Visa and MasterCard Accepted



```

700 IFCL=14THENL=0
710 IFCL>9ANDCL<14THENML=1
720 POKEL1+I+T*40,(RND(1)*2)+18:NEXT:NEXT
  :IFML=1THEN760
730 FORT=-1T01:FORI=-1T01:POKEN1+I+T*40,1
  7:NEXT:GOTO300
740 :
750 REM SUB DEATH
760 POKEA,15:POKEA+1,16:POKE54286,0:POKE5
  4290,129
770 FORT=230T0255STEP.15:POKE54287,255-T:
  POKES3281,15ANDT:NEXT:POKE54290,128
780 FORT=1T050:POKEA,(RND(1)*2)+18:POKEA+
  1,(RND(1)*2)+18
790 NEXT:POKE53272,21:POKE53280,0:POKE532
  81,5
800 PRINT"[CLR][BLK]{3 DOWN}"SPC(9)"YOU S
  ANK"BS"CARRIER":CHR$( -83*(BS<1))
810 PRINT SPC(10)"[2 DOWN]AND"MS"DESTROYE
  R":CHR$( -83*(MS<1))
820 PRINTSPC(6)"[5 DOWN]PRESS TRIGGER TO
  [SPACE]PLAY AGAIN":I=0
830 IF(PEEK(56320)AND16)=0THENRUN890
840 I=I+1:IFI>1000THENPRINT"[CLR]":END
850 GOTO830
860 :
870 REM INIT
880 GOSUB1060
890 PRINT"[CLR]":POKE53280,0:POKE53281,1
900 POKE53272,28:POKE54296,15:ZZ=80000
910 X=10:V=30:AX=360:AY=20:RX=30:H=2
920 PRINTSPC(13)"[BLK][RVS]{2 SPACES}U-BO
  AT[2 SPACES]26[2 SPACES]"
930 A$(1)="{39 SPACES}BDE{3 SPACES}"
940 A$(2)="{39 SPACES}FG{3 SPACES}"
950 A$(3)="{43 SPACES}BCDE "

```

```

960 A$(4)="{43 SPACES}HI "
970 A$(0)="{40 SPACES}OPOP "
980 FORT=1T04:PRINT"[YEL]QQQQQQQQQQQQQQQQ
  QQQQQQQQQQQQQQQQQQQQQQQQQQQ":NEXT
990 PRINT"[DOWN]"
1000 FORT=1T012:PRINT"[BLU]QQQQQQQQQQQQQQQ
  QQQQQQQQQQQQQQQQQQQQQQQQQ":NEXT
1010 FORT=1824T0203:POKET,17:POKE54272+T
  ,0:NEXT
1020 FORT=1T015:POKE1384+RND(1)*359,0:NEXT
1030 POKE1794,17:POKE1795,17:GOTO120
1040 :
1050 REM CHARSET
1060 POKE53280,0:POKE53281,4:PRINT"[CLR]
  [6 DOWN][BLU]"SPC(13)"[RVS]
  [2 SPACES]U-BOAT 26[2 SPACES]"
1070 PRINTSPC(10)"[3 DOWN]ONE MOMENT PL
  EASE"
1080 FORI=0T058:READA:POKE49152+I,A:NEXT:
  SYS49152
1090 READT:IFT=-1THE7N1130
1100 POKE12288+Q,T:Q=Q+1:GOTO1090
1110 :
1120 REM INSTRUCTIONS
1130 PRINT"[CLR]{3 DOWN} FIRE TORPEDOES F
  ROM THE SUB'S FRONT"
1140 PRINT"[3 SPACES]TO SINK SHIPS AND DE
  STROY MINES."
1150 PRINT"[3 DOWN] BEWARE OF THE DESTRUC
  TIVE AREA WHEN"
1160 PRINT"[4 SPACES]MINES AND DEPTH CHAR
  GES EXPLODE."
1170 PRINT"[3 DOWN]{3 SPACES}DESTROY AS M
  ANY SHIPS AS YOU CAN"
1180 PRINT" BEFORE YOU ARE PERMANENTLY RE
  TIERED."
1190 PRINTSPC(12)"[4 DOWN][RVS] PRESS
  [2 SPACES]TRIGGER ":POKE198,0
1200 IFPEEK(56320)AND16THEN1200
1210 RETURN
1220 :
1230 DATA 173,14,220,41,254,141,14,220,16
  5,1,41,251,133,1,169
1240 DATA 48,133,252,169,208,133,254,169,
  0,133,251,133,253
1250 DATA 162,8,177,253,145,251,200,208,2
  49,230,254,230,252
1260 DATA 202,208,242,165,1,9,4,133,1,173
  ,14,220,9,1,141,14,220,96
1270 :
1280 DATA 182,193,213,128,201,193,182,255
1290 DATA 255,159,159,159,243,243,243,255
1300 DATA 0,0,0,0,255,101,63,31
1310 DATA 0,96,112,252,255,148,255,255
1320 DATA 0,14,30,127,255,145,255,255
1330 DATA 0,0,0,0,255,166,252,248
1340 DATA 0,0,4,15,10,127,63
1350 DATA 0,192,196,200,208,224,255,254
1360 DATA 0,3,35,19,11,7,255,127
1370 DATA 0,0,32,32,240,80,254,252
1380 DATA 254,254,252,252,0,133,208,224
1390 DATA 255,255,127,63,0,80,3,31
1400 DATA 255,255,254,254,0,10,192,248
1410 DATA 127,127,63,63,0,161,11,7
1420 DATA 255,239,239,239,239,199,215,255
1430 DATA 65,41,68,175,122,189,110,219
1440 DATA 17,74,148,125,218,180,221,182
1450 DATA 255,255,255,255,255,255,255,255
1460 DATA 191,213,187,92,171,237,190,219
1470 DATA 247,174,181,125,235,189,173,222
1480 DATA-1

```

ENTER NAME

DISCOUNT OFFER

EXCLUSIVE DISKS • CARTRIDGES

BONUS COUPONS • LATEST RELEASES

EDUCATIONAL BUSINESS SOFTWARE, INC.

Presents

DISK-OF-THE-MONTH CLUB

Tape • Cartridge • Disk

NO OBLIGATION • SEND FOR DETAILS NOW

SAVE UP TO 40%

UNLIMITED SOFTWARE, INC.
DISK-OF-THE-MONTH CLUB
P.O. BOX 3223 LODI, N.J. 07644

NAME

STREET ADDRESS

CITY STATE ZIP

I own the ☐ computer ☐ with cassette ☐ disk ☐

FREE

WRITE FOR FREE C₆₄
CATALOG OF VIC 20
and C64 PRODUCTS

- SOFTWARE
- HARDWARE
- PROGRAMMING AIDS
- OPERATIONAL AIDS
- SUPPLIES
- MEDIA
- BOOKS

COMPATIBLE SYSTEMS INCORPORATED

P.O. Box 2070 • Dept. C
Saratoga, CA 95070
(408) 255-2024

MicroClear

USER COMPATIBLE SOFTWARE
FOR YOUR VIC 20 or '64

- Featuring:
- FORMATTED SCREENS
 - SELECTIVE RECALL TO SCREEN OR PRINTER
 - ADD, DELETE, REVIEW, UPDATE, REPORT FUNCTIONS

THESIS MASTER

Organizes research notes and creates bibliography. Report generator with three level sort/select. Large text area. VIC requires 8K expansion.

DISK ONLY \$29.95

STAMP COLLECTOR

Computerize your collection. Ideal for beginners and experts. Store up to 14 fields for each issue including multiple cat. nos., cat. value, cond., perf., wmk., color. VIC requires 8K expansion.

DISK OR TAPE (Specify) \$29.95

HOME LIBRARIAN

For the collector and avid reader. Random access to your own electronic card catalogue. VIC requires 8K expansion.

DISK ONLY \$29.95

Send check or money order + \$1.50 p/h to

MicroClear - P.O. Box 9368
Raytown, MO 64133

Missouri residents add 5.625% sales tax
Specify VIC or '64
DEALER INQUIRIES INVITED

PROTECT YOUR SYSTEM from POWER DAMAGE



LOW
COST

- Metal Oxide Varistor short circuits transient high voltage "spikes" before damage occurs
- Continuous ± 5 nanosecond response protection
- Handles common and differential mode surges
- Prevents software "glitches" and memory loss
- Reduces solid state equipment damage
- EMI and RFI noise suppression filters
- For use only with 110 volt, 15 amp, 60 Hz circuits
- Limited 5-year replacement warranty

Holub Enterprises, Inc., Dept. A
P.O. Box 9473
Greensboro, NC 27429

☐ Enclosed is check or money order for _____
plus \$0.50 each Solid State Protectors @ 9.50 each
plus \$0.50 each for postage and handling. (N.C.
residents add 4% sales tax.)

NAME _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____

ORDER SEVERAL — PROTECT
STEREOS, TVS AND OTHER SOLID
STATE APPLIANCES!!

HUNDREDS OF PROGRAMS AVAILABLE FOR THE COMMODORE 64 & VIC 20

Adventure • HR • NES • Epps • Speaker • Infocore
Abacus • Sinus • Bradsound • Victory • Tell
and much more

ALL PRICES UP TO 30% BELOW RETAIL!!

	RETAIL	OUR
Quick Brown Fox (64 or VIC 20)	65.00	47.50
Infocore (64 or VIC 20)	39.95	29.95
Paper Clip (C64 or VIC 20)	125.00	96.25
Jumpman (64 or Cass)	39.95	29.95
Temple of Apokal (64)	39.95	29.95
Zark I, II, or III (64)	39.95	29.95
Deadline (64)	49.95	37.50
Starwars (64)	39.95	29.95
Puzzlemaker (64)	34.95	26.25
Handicapper (64)	29.95	22.50

ACCESSORIES AVAILABLE ALSO

Monitors • Printers • Expansion Boards

CARDIO	39.95	31.95
Cardio Parallel Printer Interface	79.95	63.95
DATA 20		
Video Pak (8K rear, 40/80 coll)	149.95	119.95
includes free word processor!		

Many more products also available
for APPLE, ATARI, CP/M, IBM/PC

Write or call for FREE CATALOG
TO ORDER: CALL 1-714-951-5596
9:00 A.M. - 8:00 P.M. PST Mon-Sat

or send check or credit card no. signature & exp. date

CENTURY MICRO PRODUCTS

P.O. Box 2520

Mission Viejo, CA 92690

Visa/Mastercard add 3%. Personal checks allow 2
weeks to clear. CA residents add sales tax. Shipping
and handling add \$3.00 (hardware extra). Prices
subject to change.

WHAT GOOD IS IT IF YOU CAN'T USE IT?



COMPLETE OPERATIONAL VIDEO TAPE GUIDE TO THE COMMODORE VIC-20 \$39.95 INCLUDES TAX AND SHIPPING

This tape includes a simple explanation on how to
navigate the features and software use, along with basic
programming.

NAME _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____

VHS □ OR BETA □
CHECK, CASH OR MONEY ORDER
VIC FILE • P.O. BOX 3108
C-11 MERCED, CA 95344

Take part in our FREE FOUR-ALL

K-12 MicroMedia's
four new catalogs make it easier
than ever for you to find the kind of
programs and books you've been look-
ing for — and look at them on a no-risk,
30-day approval basis. Check them
out today!

- ☐ K-12 MicroMedia COMPUTER LITERACY catalog
- ☐ K-12 MicroMedia BASIC SKILLS catalog
- ☐ K-12 MicroMedia GENERAL catalog
- ☐ K-12 MicroMedia LEARNING GAME & SIMULATIONS catalog

Name _____
School _____
School Address _____
City _____ State _____ Zip _____

K-12 MicroMedia

172 Broadway, Woodcliff Lk., N.J. 07675
(201) 391-7555

IT'S HERE AT LAST!

THE FIRST LOW COST 6502 COMPUTER WITH 48K RAM THAT'S COMPLETELY COMPATIBLE WITH APPLE II®

Introducing the RAM-TECH® RT 2 computer which offers you greater flexibility than the Apple II+® at a price that's easier on your finances. The RT 2 will run all software and use all peripheral hardware designed for the Apple II+®. It's 100% Apple® compatible yet it offers you features not available on the Apple II+®.

COMPARE THESE FEATURES:

- supports upper & lower case characters from the keyboard
- high quality ABS case will not crack and is light weight
- RF modulator included in addition to composite video output
- high quality light-touch keyboard with upper/lower case key
- 15 key numeric key pad for fast data entry (optional)
- high power switching power supply (8.5 amps total) will power two disk drives and several peripherals easily, has internal circuit breaker
- eight expansion slots to increase flexibility with peripheral cards
- 48K RAM expandable to 64K (192K RAM upgrade card available soon)
- socketed IC's for quick and easy service
- thousands of programs (business & home) available
- operates identically to the Apple II+® with exception of extra features on RT 2
- full 90 days parts and labor warranty with fast service turn-around



THE RAM-TECH® RT 2 IS EVERYTHING YOU ALWAYS WANTED FROM AN APPLE® (AND MORE), BUT THOUGHT YOU COULDN'T AFFORD. AND THAT'S GOOD NEWS!

BUT THE BEST NEWS IS THE PRICE:

\$525.00 + \$18.00 shipping & handling

WITH OPTIONAL NUMERIC KEYPAD:

\$575.00 + \$18.00 shipping & handling

COMPARED TO APPLE II® WHICH RETAILS AT MORE THAN DOUBLE THIS PRICE AND OFFERS YOU LESS, YOU CAN SEE WHY THE RAM-TECH® RT 2 SHOULD BE YOUR CHOICE. MAKE NO SYNTAX ABOUT IT, THE RT 2 IS FOR YOU!

PERSONAL I.D. OPTION — We will burn your name into ROM. When you power up your Ram-Tech your name will be displayed on the screen. AN EXTRA MEASURE OF SECURITY AGAINST THEFT.

Indicate on your order what name you wish to use (maximum 8 letters including spaces) — ADD: \$25.00 for I.D. option.

ALSO AVAILABLE: (sub-assemblies for do-it-yourselfers) — 90 days warranty

- | | |
|---|----------|
| 1 — ABS case, high quality, Apple® look-a-like and color matched, will replace Apple® case | \$ 68.50 |
| 2 — same as #1 above but with numeric keypad cutout | \$ 84.00 |
| 3 — keyboard with upper/lower case key, direct replacement for Apple® or Ram-Tech® | \$110.00 |
| 4 — same as #3 above but with numeric keypad, use in combination with #2, also fits Apple® | \$139.50 |
| 5 — RF modulator with TV switch and cable, also fits Apple® | \$ 19.50 |
| 6 — switching power supply, 8.5 amps, internal circuit breaker, high power, also fits Apple® | \$112.00 |
| 7 — motherboard, completely assembled & tested, fully operational with burned ROMS | \$295.00 |
| 8 — bare motherboard w/ parts discription screened on board and instructions, highest quality G10 epoxy | \$ 48.00 |

SHIPPING & HANDLING FOR ABOVE: cases #1 & 2 add 19%; all others add 5%

PERIPHERALS, CARDS & ACCESSORIES FOR YOUR RAM-TECH® OR APPLE®

all items #1 to 19 guaranteed for one year (disk drives for six months)

- | | | | |
|---|----------|--------------------------|----------|
| 1 — 16K RAM card | \$ 58.00 | 11 — interger card | \$ 97.50 |
| 2 — 80 column card | \$ 94.50 | 12 — PAL card | \$114.00 |
| 3 — clock card | \$135.00 | 13 — language card | \$ 72.50 |
| 4 — communications card | \$ 89.00 | 14 — RS-232 serial card | \$ 84.00 |
| 5 — disk controller card | \$ 58.00 | 15 — Z-80 CP/M card | \$ 92.00 |
| 6 — EPROM writer card | \$124.50 | 16 — VERSA card | \$345.00 |
| 7 — FORTH card | \$ 98.50 | 17 — analog/digital card | \$116.50 |
| 8 — IEEE-488 card w/cable | \$186.00 | 18 — system cooling fan | \$ 63.00 |
| 9 — parallel printer card w/cable | \$112.00 | 19 — joy stick w/button | \$ 24.50 |
| 10 — parallel printer buffer and grappier card with cable | | | \$245.00 |

DISK DRIVES: Guaranteed high quality for use with all Apple® compatible (or Ram-Tech®) controllers — DOS 3.3 & 3.2

USE SPECIAL LOW POWER CONSUMPTION CIRCUITRY

TEAC 55A	\$325.00	\$370.00 with controller
SHUGART	\$286.00	\$330.00 with controller

SHIPPING & HANDLING: add \$3.50 per item #1 - 19 ... disk drives add \$10.00

TO ORDER

- ALL PRICES IN U.S. CURRENCY
- VISA OR MASTER CARD: SEND NUMBER, EXPIRY DATE, BANK NAME & CARD HOLDER'S NAME, INCLUDE PHONE NUMBER.
- CHECKS & MONEY ORDERS O.K. — CHECKS NEED THREE WEEKS TO CLEAR, (NO C.O.D.'S TO U.S. DUE TO POSTAL REGULATIONS)
- CANADIAN ORDERS ADD 25% FOR CDN FUNDS EXCHANGE
- U.S. CUSTOMERS WILL HAVE TO PAY U.S. CUSTOMS 4.7% DUTY, DUTIES COLLECTED BY POST OFFICE.
- WE ASSUME NO LIABILITY FOR CUSTOMS CLEARANCE.

*Apple is a trademark of Apple Computer Inc.

DEALER INQUIRIES REQUESTED

BYTE-RYTE

DEPT. CP

P.O. BOX 205, STATION CART.
MONTREAL, QUEBEC, CANADA H4K 2J5

(514) 335-1717

*Ram-Tech is a trademark of 86598 CANADA INC.

NEWS & PRODUCTS

Singing Speech Synthesizer

The Alien Group has made its Voicebox Speech Synthesizer available for the VIC and Commodore 64.

The Voicebox plugs directly into the user port, includes its own speaker, volume and pitch controls, and has an unlimited vocabulary potential.

Programs supplied with the Voicebox include: a machine language text-to-speech program that can be merged with BASIC programs; a text-to-speech program that incorporates the "Alien" face, whose mouth moves in sync with what is being said; a program demonstrating the Voicebox's ability to sing; and a spelling quiz program using the talking face as the quizmaster.

The Voicebox is available for the VIC and 64 for \$95. For an



The Voicebox Speech Synthesizer plugs directly into the VIC-20 or Commodore 64 user port.

additional \$25, Commodore 64 users can add a comprehensive music and singing system. The capabilities of the 64's SID chip are incorporated into this program, which also allows the user to enter melodies through the keyboard.

*The Alien Group
27 West 23rd St.
New York, NY 10010*

Four Programs For Atari

Advanced Computing Enterprises has added four programs to its Atari product list. They include an article indexer, a portfolio management system, a spelling game, and a math game.

MAX is the magazine article index program. It allows the user to code articles with keywords, and it performs sorts and searches in seconds. MAX is available on disk for \$29.95.

Ace Money Machine makes use of a dollar cost averaging formula to help you manage your investment portfolio. The program maintains a complete history of the progress of your investments, and can provide a detailed graph upon request. The program sells for \$19.95.

Word Wizard is a spelling tutorial game that allows the

The Modem that Delivers 3 Ways



1. Low \$189 Price. TNW's Operator-103™ provides full auto-dial and auto-answer capabilities for only \$189. This is an attractively packaged Bell-103 compatible 110 to 300 bit per second modem, delivered complete with documentation and full one-year warranty.

2. Ease of Use. Operator's commands are easy to remember, like "Dial," "Answer," and "Hangup." And they're easy to enter — you type only the first letter of the command, and Operator echoes the full command word. Type "?" and Operator lists your command options.

3. High LSI Performance/Reliability. Operator-103 is built around the TI 99532 modem IC, which means fewer errors on marginal telephone lines and reduced chance of modem failure.



3444 Hancock Street
San Diego, CA 92110

Phone (619) 296-2115
Telex 11 910-335-1194

entry of word lists of up to 50 words. The program adjusts skill levels in relation to each student's progress. *Word Wizard* sells for \$29.95.

Math Master is similar to *Word Wizard* in that it allows a parent or teacher to determine the problems to be solved and adjusts speed according to each student's success. The program is available for \$29.95.

Advanced Computing Enterprises
5516 Rosehill Road
Shawnee Mission, KS 66216

TI-99/4A Peripherals And Software

Texas Instruments has changed its marketing strategy for TI-99/4A Home Computer peripherals. Prices for peripheral equipment and some software have been cut, and TI has begun selling its disk-storage related peripherals as a package.

The Disk Drive Memory System, which now has a suggested retail price of \$550, consists of the peripheral expansion box, the disk controller card, one disk drive, and a 32K memory expansion card. Under TI's old pricing system, the suggested retail price for the above combination of equipment was \$1,200.

Other reductions include: the P-Code Card, cut from \$250 to \$100; the RS-232 card, reduced from \$175 to \$100; the telephone coupler, from \$200 to \$100; the Impact Printer, from \$750 to \$500; and TI Logo II, from \$129.95 to \$99.95.

In other news from TI, the company has signed manufacturing and marketing agreements for software from Bröderbund Software, Spinnaker Software, and Sega Enterprises. Under the agreements, the software makers will supply programs to TI, and TI will translate them to ROM cartridge and mar-

ket them.

As a result of the agreements, TI's software library soon will include Bröderbund's *Chop-lyfter*, a daredevil rescue game, and David's *Midnight Magic*, a high-resolution pinball game simulation.

Spinnaker's first offerings to TI are *Facemaker*, an educational game for 4- to 12-year-olds, and *Story Machine*, a program that teaches children to write sentences, paragraphs, and simple stories, and then brings the stories to life through color graphics and sound.

Sega, a recognized leader in coin-operated amusement games, will provide TI with *Congo Bongo*, a cartoon-like adventure that takes players over and through jungle obstacles; *Star Trek*, in which the player controls the starship Enterprise against the Klingons; and *Buck Rogers: Planet of Zoom*, a space adventure filled with challenging tunnels and channels to negotiate and bizarre aliens to outsmart.

Most of the above software is expected to sell for \$39.95 in cartridge format.

Texas Instruments, Inc.
P.O. Box 53
Lubbock, TX 79408
(800)858-4565

COMPUTER DISCOUNT

TOLL FREE 1-800-621-6131 FOR ORDERS
4251 W. Sahara Ave., Suite E Las Vegas, Nevada 89126
MONDAY THROUGH SATURDAY • 9 AM TO 6 PM

ATARI		Int'l in Programming 1		259	
12000	Robert \$259	Int'l in Programming 2&3	22	Vic 20	90
80081	Call	Home File Manager	34	Detective	89
80081	Call	Anti-Spy Reading	56	1600 Medium	55
1050 Disk Drive	359	Juggles House (O.C.)	22	1015 Men	29
410 Recorder	72	Juggles Notebook	22	Paper Clip w/p	115
830 Medium	129	On	30	Cat Book	140
830 Interface	199	Anti-Water	72	Syrus (shibby)	90
1025 Printer	429	Victrola	160	Remembrance	30
1027 Printer 8/W	549	Data Perfect	75	Frogger	33
ATARI SOFTWARE		Latter Perfect	105	Jewels	34
Assembler Editor	542	Home Accountant	48	At Apoclypse	30
Spn Assembler	39	Elephant Disc v/s	20	Phoenix's Game	30
Macro Assembler & Test	49	Donkey Kong (new)	35	Type Attack	30
Word Processor	102	Big Dog	30	B-1 Nuclear Bomber	12
Conversational Languages	42	Wren 2049	34	Midway Campaign	12
For Men	30	Carle Wolfenstein	22	Tetraland	19
Cambridge	30	Chaplin (c)	30	Devil's Midnight Magic	30
Breakout	26	Seraphine (c)	30	Chaplin	30
Space Invaders	26	Apple Peace (c)	39	Seraphine	28
Computer Chess	26	Arcade Machine (c)	39	Batso Ball	28
Asteroids	26	Mizell & the Princess (c)	25	Turtle Graphics II	45
The Bookkeeper	102	Olympic & Golden Fleece (c)	29	Hot Water	35
HARDWARE		COMMODE 64		Goldman	28
C Disk Previewer	5379	Comm 64	5279	Temple of Aphe	33
Net. 8023A	439	1541 0.0	249	Jump Man	33
Banana Printer	199	1525 Printer	249	Zork 1,2,3	33

New Educational Programs

Purchases can be made by check, money order, C.O.D.
Certe Blanche and Diners Club. 1-702-367-2215

VIC & 64

BE A COPY CAT
(CASSETTE IDEAL DUPLICATION) NOW YOU CAN
MAKE BACKUP COPIES OF ALL THE COSTLY
NON-SAVEABLE CASSETTE PROGRAMS YOU
BOUGHT

OUR BACKUP V.I.C. UTILITY PROGRAM WILL
LET YOU MAKE DUPLICATES THAT RUN

BACKUP V.I.C. WILL WORK WITH A STANDARD
5K UNEXPANDED VIC MEMORY EXPANSION IS
REQUIRED TO COPY PROGRAMS LONGER THAN
3K BYTES

\$24.95

PLUS \$2.00 SHIPPING & HANDLING
SOFTWARE PLUS

8201 SUITE C
GREENBACK LANE
CITRUS HEIGHTS, CA 95610

VISA, MASTERCARD AND MONEY ORDERS
CA RESIDENTS ADD 6% SALES TAX

VIC IS A TRADEMARK OF COMMODORE

916-726-8793

Will This Happen to You?

NOT IF YOU BUY YOUR PRINTER
FROM...

THE PRINTER STORE

After reading this issue of *Compute*, you are now fully aware of the many outstanding printers on the market today. But what you might not be aware of is that the printer you like best, might not be compatible with your computer and software. (The picture above is good example of printer incompatibility). At the **Printer Store**, we specialize in printers, so our experienced professional staff can help you choose the right printer for your personal and business needs. If you want the **Best Value, Low Price, Product Availability, and Support**, call The Printer Store and ask us about:

- FREE TECHNICAL CONSULTATION
- FULL AFTER SALE SUPPORT
- FULL FACTORY AUTHORIZED SERVICE

DOT MATRIX PRINTERS

EPSON SERIES	
FX 80	\$ CALL
FX 100	\$ CALL
OKIDATA SERIES	
92A	\$ CALL
92A	\$ CALL
92A	\$ CALL
93A	\$ CALL
94 (parallel)	\$ CALL
C. ITOH SERIES	
8510 Prowriter	\$ 395
Prowriter II	\$ CALL
New! Banana	\$ 239
IDS SERIES	
Microprism 480	\$ CALL
Prism 80	\$ CALL
Prism 132	\$ CALL
GEMINI SERIES	
Gemini 10K	\$ CALL
Gemini 15	\$ CALL
NEC 8023	\$ 419
Toshiba P 1350	\$ 1750

LETTER QUALITY PRINTERS

BROTHER SERIES	
HR-1 (parallel)	\$ CALL
HR-1 (serial)	\$ CALL
HR-15	\$ CALL
COMDEX SERIES	
CR-1 (parallel)	\$ 795
CR-1 (serial)	\$ 865
CR-2	\$ CALL
C.I.TON SERIES	
F-10 40 CPS	\$ CALL
F10 55 CPS	\$ CALL
Daisywriter 48K	
Daisywriter	\$ CALL
NEC SERIES	
3510	\$ CALL
3530	\$ CALL
3550	\$ CALL
7710	\$ 2425
7720	\$ 2900
7730	\$ 2400
NEC Accessories	
NEC Accessories	\$ CALL

C. ITOH 8510 Prowriter

- 120 CPS - 1.3K Buffer - 144x60 dots 1 inch
- Nx9 dot matrix - Proportional Spacing - 8 Character sizes - 5 unique alphabets - Greek character set - Graphic symbols - bi-directional, logic-seeking - Adjustable tractors - Single-sheet friction feed - Vertical & horizontal tabbing.

C. ITOH 8510 Prowriter List \$795 **\$395**

BROTHER HR-1

- 16 CPS - Bi-directional - Super and Subscript
 - IBM Selectric type ribbon - Prints up to 6 copies
 - Ideal for word processing
- Parallel List 1100 **\$ Call**
Serial List 1200 **\$ Call**

INTERFACE EQUIPMENT

Apple Dumping	\$145	Printer Stands large	\$95
Graggler Plus	\$ CALL	Printer Stands small	\$25
Complete stock of Epson Accessories	\$ CALL	Printer Ribbons	\$ CALL
Custom Printer Cables for Apple, Atari, IBM	\$ CALL	Printer Sound Enclosure	\$ CALL
TRS-80	\$ CALL	64 Interface	\$ CALL

In order to serve you better, The Printer Store will be moving to larger facilities. The move should be completed by Aug 25.

We carry a full line of Cables and Accessories
Call (714) 241-0701 and ask us about. . .

THE
Printer

We are so confident of our LOW PRICES and SUPPORT that we are going to ask you to make the initial investment by calling us in return, when you buy your printer from us, we will rebate the cost of your call and deduct it from your invoice

HOW TO ORDER: Our phone lines are open from 8 a.m. to 6 p.m. PST, Monday-Friday. We accept VISA, MASTERCARD (no extra charge), personal checks (take two weeks to clear, CDD's accepted). Sunday shipping on orders placed before 1 p.m. Manufacturer's warranty applicable on all equipment. Prices subject to change.

STORE — 2720 S. Harbor Blvd., Suite E, Santa Ana, CA 92704

© The Printer Store, 1983

**The First and Only System to Backup
Diskettes Protected by Bad Sectoring
without modification to your drive.**



ATARI DISK BACKUP SYSTEM \$49.95

Superclose is the only ATARI diskette backup system that lets you backup just about ANY "copy protected" diskette including those protected by "bad sectoring." Bad sectors and sectors are created without any loss of data or adjustments to your hardware. Each backup diskette generated by Superclose functions exactly like the original. Self-booting, on-line fix, we suggest that you use the backup and save the original.

Superclose includes:
SCAN ANALYSIS - Map of diskette contents (location of data, bad sectors, etc.)
FORMATTING/BAD SECTORING - Non-ATARI DOS formatting and bad sector/sector deletion
BACKUP - Copies just about everything we can find regardless of protection scheme

Superclose is user-friendly and simple to use.
PIRATES TAKE NOTE: SUPERCLOSE only allows two copies to be made of any specific diskette. Sorry!!

SYSTEM REQUIREMENTS

Atari 400 or 500 Computer / 48K Memory
One Atari 512 Disk Drive / Printer Optional
Available at your computer store or direct from
PROMTRON. Include \$2.00 (\$5.00 Foreign Order) for each system. DEALER INQUIRIES ENCOURAGED

TOLL FREE ORDER LINE:
ON Hrs. 1-800-446-4780
In Nevada or for questions
Call (702) 786-4600
Personal checks allow 2-3
weeks to clear. MIC and
VISA accepted. Include
shipping.



316 California Avenue, Suite #712
Reno, Nevada 89503 - (702) 786-4600
Others make calls. SUPERCLOSE makes copies!!
ATARI is a Trademark of ATARI, Inc.

For Your TI-99/4A FLIGHT SIMULATOR

The Dow-4 Gazette is a realistic IFR simulation of a typical 4-place private plane. It is not a game. A manual with 30 pages of text plus 7 figures helps the novice learn to fly. Experienced pilots will enjoy flying the ILS approach. Response time under 1 sec. average. Display shows full panel (10 dials & 11 lights) and indicates position of runway for landing. Realistic sound effects. See reviews in Jan 83 99'er and Jan 83 AOPA Pilot. Only requires joystick \$30.

EDITOR/ASSEMBLER

The Dow E/A turns your computer into an assembly language machine. Requires Mmu Memory Module. Load once and use all day, saving and restoring source assembly language programs on cassette (1 sec. per statement), just as you do with Basic. Supports all of the TI's instructions, 6 directives, and various interactive commands. Assembles into memory in 5 sec. per statement. Manual includes sample program with detailed explanations. Increase your programming enjoyment over the Line-by-line Assembler, and if you upgrade to TI's Editor/Assembler, you can convert your programs without rekeying them \$25

Send SASE for additional information. To order, send check or MO. U.S. funds:
JOHN T. DOW
6360 Canon
Pittsburgh, PA 15217

First class postage to U.S. and Canada included—others add U.S. \$2 (PA residents add 6% state sales tax).

Baseball For Atari, Commodore 64

Star League Baseball, an action and strategy game from Gamestar, is available for Atari and Commodore 64.

The game features realistic animation including windup, delivery, and the arc and shadow of a fly ball. Sounds generated by the program include the crack of the bat, the cheers of the crowd, and the music of the seventh inning stretch.

Players choose their starting team and pitcher, can bring in relievers, and can take batting practice against the legendary "Heat" Muldoon.

Star League Baseball, which can be played against the computer or a human opponent, sells for \$31.95.

Gamestar, Inc.
1302 State St.
Santa Barbara, CA 93101
(805) 963-3487

Investment Manager, Disk Manager, And Games

Bytes and Bits has released a handful of programs for the Commodore 64 and VIC-20 computers.

Investment Portfolio Manager is a program to track volatile assets such as stocks and stock options.

The program, for disk-based Commodore 64 systems, can handle entries of up to \$99,999 and can report on nine investment categories. It is available for \$14.95.

Disk Directory Manager, which can sort more than 1500 filenames into an organized list, is available for \$19.95 for the VIC or 64. The program is written in machine language.

In *Dungeons* for the VIC-20 with 16K expansion, the player creates characters who explore a 12-level, 1200-room dungeon. The game is available on tape or disk for \$19.95.

Pak Alien for the unexpanded VIC is a machine language game that includes 100 difficulty levels. Guide your alien through a maze of interplanetary space particles while dodging seven aliens. *Pak Alien*, which can be played with joystick or keyboard, sells for \$14.95 on tape or disk.

Bytes and Bits
524 East Canterbury Lane
Phoenix, AZ 85022
(602) 942-1475

High Speed Printer

Epson America has introduced its new FX-100 dot matrix printer. The printer, which carries a suggested price of \$895, provides a printing speed of 160 characters per second.

The printer offers a wide range of features including elite or pica spacing and a one-to-one graphics ratio so accurate graphics—including circles—can be drawn. Users also can create their own character formats on screen and download the font into the printer's memory.

The printer includes a rubber platen that can handle single sheet or roller-fed paper plus a removable tractor to handle pin-fed paper and forms.

Epson America, Inc.
3415 Kashiwa St.
Torrance, CA 90505
(213) 378-2220



The Epson FX-100 printer has a printing speed of 160 characters per second.

Arcade-Quality Apple

Third Millennium Engineering has introduced the Arcade Board, which generates arcade-quality color graphics and sound effects on Apple II, II+, and IIe computers.

The board uses many of the same video and sound chips used in coin-operated video games.

The Arcade Board comes with more than 20 program demos, games, and utilities, and it adds more than 40 commands to Applesoft BASIC. These commands make it possible to create action with the convenience of BASIC, but with the speed of machine language. The Arcade Board sells for \$225.

Third Millennium Engineering Corp.
1015 Gayley Ave., Suite 394
Los Angeles, CA 90024
(213) 473-2102

Speech In Many Voices

Don't Ask Software has produced a version of its *Software Automatic Mouth (S.A.M.)* for the Commodore 64 computer. In addition, the Apple and Atari versions of the program have been enhanced to include KNOBS, a feature that provides a range of different voices.

S.A.M., which occupies 2K of user memory, will convert phonetic spellings to speech. A text-to-speech Reciter program, available on the S.A.M. disk, will convert English spelling to speech; it takes 8K of user RAM. KNOBS gives the program access to a variety of voices, so characters can be made to converse.

The Commodore 64 version of the program and the updated Atari version sell for \$59.95. The Apple II version, which contains a digital-to-analog converter and

audio amplifier, sells for \$124.95. Present owners of the program can receive the updated versions for a small fee, provided they have sent in their owner registration cards.

Other new products from Don't Ask include *Chatterbee*, a spelling game that includes a version of the S.A.M. voice synthesizer. *Chatterbee* is available for Atari and Commodore 64 for \$49.95.

Wordrace for Commodore 64 is a vocabulary game with 2600 words. It is available in a gamepack that includes *Claim to Fame*, a history game, and *Sports Derby*, a sports fact game. The *Wordrace* gamepack is available on disk or cassette for \$34.95.

Add \$2 for shipping and handling for Don't Ask products.

Don't Ask Computer Software
2265 Westwood Blvd., Suite B-150
Los Angeles, CA 90064
(213) 477-4514

CASSETTES !!!

FOR YOUR COMPUTER DIGITAL

- Computer Grade
- Wide Dynamic Range
- 100% Error Free
- 5 Screw Housing
- Fully Guaranteed
- Carefully Packed

All Prices Include U. S. Shipping
Phone Orders Add \$2.50 C.O.D. Fee

COMPUTER TAPE PRICES

Length	25 LOT	100 LOT	1000 LOT
C-5	45/11.25	35/35.00	30/300.00
C-10	50/12.50	35/35.00	30/300.00
C-20	55/13.75	40/40.00	35/350.00

BASF DPS Tapes Add .05 Cents Per Tape
— Custom Lengths Available —
... Write For Volume Prices ...

— Norelco Cassette Cases and Labels —
(With Cassette Orders Only)

12-249 Cases: 20 Ea	250-	13 Ea
12 Labels for 20		120 for 1 70
1000 Pinked Labels		14 50

SEND MONEY ORDERS OR CHECKS TO:

CASS-A-TAPES

Box 8123-C
Kansas City, MO 64112
816-444-4551

*DOUBLES DISKETTE STORAGE SPACE!!

REDUCE YOUR DISKETTE COSTS BY 50%



"The back of your 5 1/4" single sided diskette has recording medium. All you need is an ACCURATELY placed "write enable notch"

to use it, on many systems. **"NIBBLE NOTCH"** is a precision engineered tool designed for this purpose.



IT'S A MONEY SAVER!
IMMEDIATE SHIPMENT!

ONLY **\$14.95**

Add \$1.50 Postage/Handling (\$4.50 Foreign)

— Florida Residents Add 5% Sales Tax —

ORDER TODAY!
SEND CHECK OR MONEY ORDER TO
"NIBBLE NOTCH"

Division of Cortran International
4211 N.W. 75th Terrace, Dept. 1211
Lauderhill, Florida 33319

FAT 7102



EDUCATIONAL PROGRAMS FOR ATARI

Written by James McKay
"Written by A Math Teacher for His Children"

- Large number & letter displays along with color, fonts, graphics, sounds & positive statements
- Complete solutions shown when errors are made
- Easily obtainable scores, selected levels of difficulty in most programs
- Student, parent and teacher tested and sold around the world
- 50 cassettes currently available written in BASIC and running on 16K or more

- LEVEL 1:** Counting/ABC's/Counting Things/Next Letter (Preschool, Early Elementary, Joystick).
- LEVEL 2:** Adding/Subtracting (Grades K-4, Joystick).
- LEVEL 3:** Clocks/Numerals/Counting by 2's, 3's, etc. (Grades K-4, Joystick).
- LEVEL 4:** Fractions/Money (Grades 1-5, Joystick).
- LEVEL 5:** Story Problems (Grades 2-6, Keyboard).
- LEVEL 7:** Addition/Subtraction/Both (Grade 2-6, Keyboard).
- LEVEL 8:** Multiplication/Memory (Grades 2-8, Keyboard).
- LEVEL 9:** Division/Memory (Grades 2-8, Keyboard).

Each cassette (Level) is \$14.95
Plus \$2.00 Shipping & handling (Michigan residents please enclose 4% sales tax) Please indicate Level(s)

The Emporium Co.

201 East Douglass Street,
Bangor, Michigan 49713 U.S.A.

HARMONY VIDEO & COMPUTERS

800-221-8927

COMMODORE

VIC 20	79.95
COMMODORE 64	189.95
VIC 2ND DATASETTE	54.95
COMMODORE DISC DRIVE	197.95
1525P PRINTER	197.95
COMMODORE MONITOR	209.95
VIC TELEPHONE MODEM	67.95
102 BASIC PROGRAM	35.95
FLOPPY DISCS SS/DD	14.95
VIC 8K MEMORY PAC	39.95
VIC 16K MEMORY PAC	84.95
DISC LIBRARY	14.95
VIC 3K SUPER EXPANDER	64.95
1212 PROGRAMMER'S AID	59.95
JOYSTICK	10.00
INTRO TO BASIC I & II	69.95

APPLE 2 PLUS	999.95
APPLE DISC 2	319.95



EPSON	
MX 80 PRINTER	399.95
OKIDATA	
92A PRINTER	499.95

ATARI

400 W16K	69.95
800 W48K	249.95
1200 XL W64K	349.95
410 RECORDER	69.95
1010 RECORDER	73.95
NEW 1050 DISC DRIVE	349.95
830 ACOUSTIC TEL. MODEM	139.95
600 XL	CALL
800 XL	CALL
1400 XL	CALL
1450 XL	CALL
16K MEMORY EXPANDER	84.95
JOYSTICK	10.00
PROGRAMMER KIT	49.95
1020 40 COL PRINTER	199.95
FLOPPY DISCS SS/DD	14.95

WE CARRY A FULL LINE OF SONY TV & PROFEEL

SONY KV 1313	299.95	SONY KV 1917	399.95	SONY KV 1746	439.95	SONY 1901 PROFEEL	529.95
SONY KV 1222	349.50	SONY KV 1918	399.95	SONY 2501 PROFEEL	929.50	SONY KV 2654	659.95

**SEND
\$2.00
FOR
LATEST**



VCR PRICES TOO LOW TO PRINT!

**ALL
VCR's
IN
STOCK
CALL
FOR
LOWEST**

VIDEO TAPE (By case of 10 only)

	VHS	VHS	HIGH	BETA	BETA	BETA
	T120	T160	GRADE	L500	L750	L830
TDK	8.25	11.75	10.25	6.50	7.99	9.25
FUJII	8.50	14.75	11.75	6.50	7.99	
MAXELL	8.25	11.75	10.25	6.50	7.99	9.25
MEMOREX	8.25	11.75	10.10	6.50	7.99	9.25
SCOTCH	7.99	11.75	9.95	6.50	7.99	
SONY			10.25	6.80	7.85	9.25
JVC	8.15	11.75	10.35			
RCA	7.55					
PANASONIC	7.25					
			TDK PROFESSIONAL T120			15.95
			MAXELL PROFESSIONAL L750 OR T120			15.95
			SCOTCH PROFESSIONAL			14.95

**P
R
I
C
E
S**

FOR THE LOWEST PRICES ON VIDEO CALL 800-221-8927

To order simply dial toll free 800-221-8927 with your Master Card or VISA and your order will arrive via UPS or send certified check or money order only to: HARMONY VIDEO AND ELECTRONICS, 2357 Coney Island Ave., Brooklyn, N.Y. 11223, and add approximate shipping postage and insurance charges. Credit cards for phone order only. For customer service please dial (212) 627-8960. All prices and availability subject to change without notice. All orders shipped out of state. Dealer inquiries invited!!! For sales info dial (212) 627-6989. Open Sun. 10-4 Mon.-Thur. 9-7 Fri. 9-3.

800-221-8927

COMMODORE ATARI APPLE TEXAS INSTRUMENTS EPSON

JVC • PANASONIC • SONY PROFEEL • ZENITH • HITACHI • QUASAR

G.E. • SANYO • SONY PROJECTION • TDK • MAXELL • FUJI • SCOTCH • SONY • RCA

POWER LINE PROBLEMS?



SPIKE-SPIKER® ...THE SOLUTION

Protects, organizes, controls computers & sensitive electronic equipment. Helps prevent software "glitches", unexplained memory loss, and equipment damage. Filter models attenuate conducted RF interference, 120V, 15 Amps. Other models available. Ask for free literature.



DELUXE POWER CONSOLE \$79.95

Transient absorber, dual 5 stage filter, 8 individually switched sockets. Fuse, mon switch, & I/O



QUAD-II \$59.95

Transient absorber, dual 3 stage filter, 4 sockets, I/O



QUAD-I \$49.95

Transient absorber, 4 sockets



MINI-II \$44.95

Transient absorber, 3 stage filter, 2 sockets

MINI-I \$34.95

Transient absorber, 2 sockets



215-837-0700

Out of State Order Toll Free

800-523-9443

KALCO®
6584 Rock Rd., Dept. CP
Berwyn, PA 19017

DEALER INQUIRIES INVITED • CORDS add \$3.00 • Ship.

Holiday Adventures

Chartscan Data is producing *bitCards*, text and graphic adventures designed as holiday gifts. *bitCards* are customized with personal references to the recipient, and the player's reward for completing the adventure is a personal message chosen by the sender.

The first *bitCard*, *A Christmas Adventure*, is available on disk for 48K computers in the Apple II series, and on tape for Atari 400/800, Radio Shack Color Computer, Commodore 64, unexpanded VIC, and VIC with 8K expansion. All versions sell for \$16.95.

bitCards

120 South University Drive, Suite F
Plantation, FL 33317
(305) 473-4741

Games Converted For Atari

Activision has converted two of its best-selling home videogames for Atari home computers.

The games, *River Raid* and *Kaboom!*, have been enhanced to make use of the increased power and memory availability of the Atari computers.

In *River Raid* the player pilots a BI Strato-wing Assault Jet over a constantly changing river course. New twists added to the game include hovering hot-air reconnaissance balloons, helicopters and tanks that shoot back, vivid graphics and battle sounds, an expanded control panel, a pause feature, and the ability for more advanced players to select more difficult river sections.

Kaboom! features the Mad Bomber, a convict who roams the rooftops dropping bombs. The player maneuvers water buckets to catch the falling bombs. New additions to the game include a variation that

allows one player to be the Mad Bomber and the other to catch the falling bombs, a high-score table, and a musical score which features the 1812 *Overture*.

Both games retail for \$34.95.

Activision, Inc.

2350 Bayshore Frontage Road
Mountain View, CA 94043
(415) 960-0410

Software Assortment For Timex/Sinclair

Dynacomp has introduced an assortment of software products for the 16K Timex/Sinclair computer.

The new programs are:

Blackjack, \$12.95; *Checkbook*, \$14.95; *Data Filer*, \$19.95; *Graphics Drawer*, \$14.95; *Phone Book*, \$12.95; *Pixel Drawer*, \$14.95; *Tic-Tac-Toe*, \$9.95; and *Word Scramble*, \$9.95.

Each of the programs is described in the free product catalog available from Dynacomp.

Dynacomp, Inc.

1427 Monroe Ave.
Rochester, NY 14618

Game Cartridges For The TI

Funware, which recently was acquired by Creative Software, has added to its list of available cartridge software for the TI-99/4A.

Among the new games are:

St. Nick, in which the player helps Santa fly through a maze and pick up toys while avoiding flying witches.

Schnoz-ola, a game based on a tale about a Mayan prince with tremendous jumping powers and a tremendous nose. The prince must climb a four-tiered pyramid to collect sacred flowers, while dodging fireballs tossed at him by angry gods.

ComputerAbility



THE LARGEST ATARI MAIL ORDER COMPANY
PRESENTS THE HOTTEST TITLES

TI - CARTRIDGE

PAC-MAN	34.95
CENTPEDE	34.95
DEFENDER	34.95
DIG DUG	34.95
DONKEY KONG	34.95

VIC-20 - CARTRIDGE

PAC-MAN	34.95
CENTPEDE	34.95
DEFENDER	34.95
DIG DUG	34.95
DONKEY KONG	34.95
STARGATE	34.95
ROBOTRON	34.95

COMMODORE 64 - CARTRIDGE

PAC-MAN	34.95
CENTPEDE	34.95
DEFENDER	34.95
DIG DUG	34.95
DONKEY KONG	34.95
STARGATE	34.95
ROBOTRON	34.95

APPLE - Disk

PAC-MAN	27.95
CENTPEDE	27.95
DEFENDER	27.95
DIG DUG	27.95
DONKEY KONG	27.95
STARGATE	27.95

Quantities Limited S-H \$2.00 per order

(800) 558-0003

IN WISCONSIN

(414) 351-2007

Computability • P.O. Box 17802 • Milwaukee, WI 53217

SAVE



VIC 1701
COLOR MONITOR
COMMODORE 64



VIC 1541 DISK DRIVE



DATASETTE



Micro Software International Inc

PICK YOUR BEST COMMODORE COMPUTER PACKAGE AND SAVE EVEN MORE...

C 64	\$209.00	C 64	\$209.00
VIC 1541	239.00	or VIC 1530	65.00
VIC 1701	249.00	VIC 1701	249.00
Total	\$680.00	Total	\$510.00
SAVE . . . \$	\$ 37.00	SAVE . . . \$	\$ 33.00

Everything you need
to support your
COMMODORE VIC20 and C64

Cardco, Creative Software, EPYX, HES, UMI, WICO, Romox.

PractiCalc 20
For the Commodore VIC-20
16K RAM required

Tape (CV2T10)	\$28.00
Disk (CV2D10)	33.00
PractiCalc 64-For the Commodore 64	
Tape (C60T11)	\$37.00
Disk (C60D11)	39.00



TEXAS
INSTRUMENTS

NEW

T.I. PERIPHERAL EXPANSION UNIT

PHP 4000 includes:

- PHP 1200 Peripheral Expansion • PHP 1240 Disk Controller Card • PHP 1250 Expansion System Disk Drive • PHP 1260 Memory Expansion Card 32K.

AT THE NEW LOW PRICE OF ONLY \$455.00
Original Retail \$1,199.80

With the purchase of PHP 4000 package receive
one of the following modules FREE!

- PHP 3111 T.I. Writer • PHP 3113 Microsoft Multiplan • PHM 3109 T.I. Logo II

EACH A \$99.95 Retail Value!

GET A T.I. SPEECH SYNTHESIZER FREE

T.I. will give you a Speech Synthesizer
a \$99.95 retail value—FREE—when
you buy six solid state software cer-
tridges. Offer expires January 31, 1984.
Ask for coupon.

PHP 1220 RS 232 Card	\$ 83.95
PHP 1270 P-Code Card	83.95
PHP 1600 Modem	83.95
PHP 2500 T.I. Printer	349.95



We carry in stock all hardware and software for T.I. HOME COMPUTERS.

QUANTITIES LIMITED!

SAVE

SOUTHERN AUDIO VIDEO ELECTRONICS, INC.

1782 Manetta Blvd., N.W., Atlanta, Georgia 30318

Order Toll Free 1-800-241-2682
In Georgia (404)-351-8459

For a complete listing of all SAVE's products, send \$5.00
for our catalogue (refundable with your first order).

Enjoy the convenience of in-home shopping. Call our
toll free number today for orders only.

Use your American Express, VISA, Mastercard, check
or money order. Minimum order of \$50.00. Outside con-
tinental U.S.A. minimum order \$250.00 U.S. currency.
Shipping and handling charges are extra. All prices are
subject to change without notice. Allow 2-4 weeks for
delivery. Prices good through December 15, 1983.

FREE ZX81/TS1000 CATALOG



New from Gladstone Electronics! Our ZX81/TS1000 catalog will take you where no one has dared go before! You will view the widest selection of up-to-date software, books and hardware add-ons available to get the most from your personal computer. This exciting new 32 page color catalog lists music, fantasy and family games, business and educational programs, books for beginners as well as experienced users, hardware add-ons and other peripherals for use with ZX81/TS1000 Home Computer!

Use the convenient coupon below and send for your FREE catalog TODAY!

Now! Write for yours Today!
Complete and mail now for your FREE copy!
For information call (716) 377-5510

GLADSTONE Electronics C-11

Please rush me this exciting new ZX81/TS1000 catalog.

Name _____

Address _____

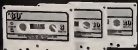
City _____ State _____ Zip _____

Mail to: 1595 Kenmore Ave., Buffalo, N.Y. 14217

In Canada: 1738 Avenue Rd., Toronto, Ont. M6M 3Y7

COMPUTER CASSETTES

100% Error-Free • Fully Guaranteed



	12	24
LENGTH	PACK	PACK
C-05	79¢	69¢
C-10	89¢	79¢
C-20	99¢	89¢
Boxes	26¢	21¢

UPS \$3.00 Pkg. \$18.00 Case

C-10's 39¢
(Min. 500 Cases Lot)
w/labels ADD 4¢
w/boxes ADD 13¢

FOR ORDERS ONLY
1-800-526-6050
Extension 3005

MICRO-80™ INC.

2665-C Busby Road
Oak Harbor, WA 98277

Ambulance, in which the player serves as an ambulance driver helping sick people get treatment. The player must decide who needs help first and whether the patient should be taken to the hospital or an emergency center.

Driving Demon, a game in which the player tries to drive as far and as fast as possible within a time limit. Problems include oil slicks, other cars, and engine troubles; navigational aids include a tachometer, speedometer, and a long-range scanner.

Funware's cartridge games sell for \$44.95, and are guaranteed to work in all present and future versions of the TI-99/4A home computer.

Funware, Inc.
230 East Caribbean Drive
Sunnyvale, CA 94089
(408) 745-1655

Pinball Simulation For The 64

Brøderbund Software has converted *David's Midnight Magic*, a pinball simulation game, into Commodore 64 format.

The game, described as the next best thing to a real pinball machine, simulates dual flipper controls, bumper action, roll-overs, sounds, and lights. The player can even put English on the ball, but too much will result in a tilt.

David's Midnight Magic, originally sold in Apple and Atari versions, is available for the Commodore 64 on disk for \$34.95.

Brøderbund Software
500 Fifth Ave.
New York, NY 10110

Apple Graphics Program

T & G is an Apple graphics system from C & C Software. The

program does not rely on shape tables, so execution is faster than for many other graphics programs.

T & G includes three character sets, the largest of which is 1½ times the size of standard Apple characters.

The characters can be placed on the screen using one of two commands. One is similar to BASIC's PRINT command; the other permits greater control over text placement. Lowercase is available in the two larger character sets, and the ability to print superscripts, subscripts, and text overlays is provided.

The program also is a powerful utility for producing static or animated graphics. The editor program supports full color and includes a command for clearing a precisely defined area of the screen.

T & G is available for \$65.

C & C Software
5713 Kentford Circle
Wichita, KS 67220
(316) 683-6056

Hardware/Software Combo For Atari 800

MEM/EX is a memory expansion device for the Atari 800 computer. It replaces the operating system board and includes 4K of low-power CMOS static RAM mapped to the unused \$C000 address space.

Included with the board is a powerful command-extender program called COM/EX. This adds ten edit-mode commands to the standard BASIC or Assembler cartridges, including the most used disk commands.

MEM/EX is compatible with all standard Atari 800 configurations; COM/EX requires at least one disk drive and DOS 2.0. The package is available for \$129.95.

Prairie Physics
P.O. Box 2369
Wichita, KS 67201

SoftWare Warehouse outlet

MEETING YOUR SOFTWARE
NEEDS FOR LESS!!!

COMMODORE 64z

Broderbund	
Chopflitter (CT)	30.40
Sea Fox (CT)	27.00
Serpentine (CT)	27.00
David's Midnight Magic (D)	27.00
Sky Blazer (D)	27.00
A.E. (D)	27.00
Load Runner (D)	27.00
Commodore	
Assembler 64 (D)	16.90
Logic (D)	47.90
Pilot (D)	47.90
Pet Simulator (D)	16.90
Screen Editor (D)	16.90
Bonus Pack (D,C)	16.90
CP/M 2.2 Operating System (CT)	
Super Expander VSP (CT)	69.00
Easy Finance (1-5) (D)	16.90
Easy Calc 64 (D)	73.75
The Manager (D)	43.00
Easy Script (D)	43.00
Easy Mail 64 (D)	16.90
Easy Spell 64 (D)	16.90
Word/Name Machine (D)	16.90
Intro to Basic 1 (C)	19.35
Gortek & The Microchips (C)	24.90
Easy Lesson/Easy Quiz (D)	16.90
Music Machine (CT)	16.90
Coderwriter (D)	47.90
Zark 1,2,3 (D)	29.60
Inventory Mgmt. (D)	43.00
Payroll/Checkwriting (D)	43.00
Accts. Payable (D)	43.00
Accts. Receivable (D)	43.00
General Ledger (D)	43.00
Continental	
The Home Accountant	50.72
Creative Software	
Car Costs (C) 10.15 (D) 13.50	
Decision Maker (C) 10.15 (D) 13.50	
Household	
Finance (C) 15.50 (D) 16.90	
Home Inventory (C) 10.15 (D) 13.50	
Loan Analyzer (C) 10.15 (D) 13.50	
Moon Dust (CT)	23.65
Astrolite (CT)	23.65
Treasure Hunt (CT)	23.65
Save New York! (CT)	23.65
Defsoft	
Moonshuttle (D, C)	20.30
Poo Yan (C, D)	20.30
Genesis (D)	27.00
D'Riley's Mine (D)	20.30
Epyx	
Temple of Apophel (D)	27.00
Upper Reaches of Apophel (D)	13.55
Curse of the (D)	13.55
Sword of Fargol (D)	20.30
Jumpmen (D, C)	27.00
Yes Software	
Hot Men 64 (CT)	27.00
Turtle Graphics II (CT)	40.60

Hot Winter 64 (CT)	30.45
Gridrunner (CT)	20.25
Retro Ball (CT)	20.25
Benji Space Rescue (D)	30.45
Coco (D, C)	27.00
Micro Press	
Floyd of the Jungle (D)	20.80
Helicot Ace (D)	20.80
Sieras On Line	
Frogger (D, C)	23.65
New Jewels (D)	20.30
Cosplay (D)	20.30
Sirius Software	
Squish 'Em (D)	23.65
Repton (D, C)	27.00
Black Blackpool (D)	27.00
Critical Mass (D)	27.00
Type Attack (D)	27.00
Spinaker	
Faca Maker (D)	23.65
Hey Diddle Diddle (D)	20.30
Kinderroom (D)	20.30
Snooper Troops 1 (D)	27.00
Fraction Fever (D)	23.65
Amazing Thing (D)	27.00
Synapse	
Fl. Apocalypse (D, C)	23.70
Protector (D, C)	23.70
Survivor (D, C)	23.70
Shamus (D, C)	23.70
Timewarps	
Dungeons of Algebre	
Dragons (D, C)	19.10
Robbers of the Lost Tomb (D, C)	19.10
Wall Street (D, C)	19.10
Money Manager (D, C)	19.10
Electronic Checkbook (D, C)	19.10
Word Pro 3+	85.00

ATARI

Broderbund	
David's Midnight Magic (D)	23.90
Apple Panic (C, D)	20.30
Chopflitter (D)	23.70
Serpentine (D, C)	23.70
A.E. (D)	23.70
Sea Fox (D)	23.70
Labyrinth (D, C)	20.30
Generic Drift (D, C)	20.30
Continental	
The Home Accountant	50.72
The Tax Advantage	40.60
Defsoft	
Micropainter (D)	22.65
Pac Coast Hwy. (C, D)	16.90
Trick Wizard (D)	33.80
Canyon Climber (C, D)	16.90
Cloves and Balloons (C, D)	16.90
Basic Compiler (D)	54.00
Spell Wizard (D)	27.00
Sands of Egypt (D)	20.30
Zaxxon (D, C)	27.00
Moon Shuttle (D, C)	20.30
D'Riley's Mine (D, C)	20.30
Russell's Brigade (D, C)	11.50
Poo Yan (D, C)	20.30
Bruce Lee (D, C)	27.00
Genesis (D, C)	27.00
Epyx	
Temple of Apophel (D)	27.00
Crash, Grumble and Champ (D, C)	20.30
Jumpmen (D)	27.00
Crail of the Unwield (D)	27.00
First Star	
Gift for Availability and Pricing	
Micro Press	
Chopper Rescue (D, C)	20.75
Floyd of the Jungle (D, C)	20.75
Helicot Ace (D, C)	20.75
Wingman (D, C)	25.00
Synapse	
Shamus II (D, C)	23.70
Pharaoh's Curse (D, C)	23.70
Fl. Apocalypse (D, C)	23.70
Nastulus (D, C)	20.30
Blue Max (D, C)	23.70
Dimension X (D, C)	23.70
Zappelin (D, C)	23.70
Spinaker	
Pacemaker (CT, D)	23.65
Snooper Troop 1 or 2 (D)	30.20
Hey Diddle Diddle (D)	20.30
Story Machine (D)	23.65
Thorn E.M.I.	
Jumpin' Jet Pilot (CT)	30.45
Sub Commander (CT)	30.45
Figure Fun (CT)	20.30
Soccer (CT)	30.45
Kickback (CT)	30.45
Home Fin. Mgmt. (CT)	20.30
Carts (CT)	20.30
Parlor Bros.	
Progger	37.00
Q Bort	37.00
Amre Chase	37.00



Broderbund	
Serpentine (D)	23.70
Pac (D)	23.70
Arcade Machine (D)	40.80
Apple Panic (D)	20.30
Chopflitter (D)	23.70
David's Midnight Magic (D)	23.70
Continental	
The Home Accountant	50.72
The Tax Advantage	40.60
PCM (Form Letter)	67.64
Defsoft	
Zaxxon (D)	27.00
Canyon Climber (D)	16.90
Sands of Egypt (D)	20.30
Pathom 40 (D)	23.70
Lisp (D)	67.50
Micro Painter (D)	23.70
Poo Yan (D)	20.30
Bruce Lee (D)	27.00
Genesis (D)	27.00
Moonshuttle (D)	20.30
First Star	
Gift for Availability and Pricing	
Spinaker	
Pacemaker (D)	23.65
Story Machine (D)	23.65
Hey Diddle Diddle (D)	20.60
Programs for all Systems	
Avision Hi8 Strategic Simulations	Call for Availability and Price

VIC 20, T.J. 99 4A, RADIO SHACK, IBM-PC SOFTWARE LISTS AVAILABLE

Commodore

Commodore 64	229.95
1541 Disk Drive	229.95
1630 Casette	61.30
1525 Printer	214.75
1701 Color Monitor	299.95
1600 Modem	30.30
Parallel Interface	60.00
3 Port Expander	75.00
8 Port Expander	75.00
64 Prog. Ref. Guide	17.00
Diskette	21.00
BASF 5 1/4" 52DD 2 pak	5.50

BASF Soft Box (10)	23.50
Jaytek	
Pointmaster	10.95
Pointmaster Pro	18.55
File Control	7.85
Word Command Ctrl.	19.50
Word "Boss"	13.50
Word Ref. Ball	20.75

COLECO

Coleco	
Adam Computer System	995.00
Adam Computer Module	445.00

For additional information and to order, call Toll free:

Outside Texas 1-800-527-8698 Inside Texas 1-800-442-8717

Terms and Ordering Information:

To order call 1-800-527-8698 and send certified checks, money orders or personal checks (allow 2 weeks to clear), or use your VISA, Master Card or American Express. Inside Texas call 1-800-442-8717. Include \$2 for postage and handling. (C.O.D. orders add \$1.50) UPS Blue Label \$3, Canada \$6. Other countries include 10% for P.H. All products factory sealed with manufacturer's warranty. All returns require R.A.R. Prices subject to change without notice. Order desk hours: Mon-Fri 8-5, Sat 9-1 CST.

SoftWare
Warehouse outlet



802 N. HIGH
SUITE H
LONGVIEW, TX.
75601

Games For The VIC And 64

Creative Software has produced *In the Chips*, an educational game for the VIC-20.

In the game, one or two players are given \$100,000 with which to organize a software company, research and develop a product line, and plan marketing strategies. The winner will be the one who assesses the market correctly and turns the largest profit.

The game, which is available in a cartridge, sells for \$29.95.

Another new offering from Creative is *Crisis Mountain*, previously available for Apple and Atari. The game, licensed to Creative from Synergistic Software, is an adventure in which the player must guide mine explorer Kip Armstrong to treasure while avoiding traps, bombs, and bats.

Crisis Mountain, sold in cartridge format, is available for \$34.95 for the 64, and \$29.95 for the VIC.

Creative Software
230 East Caribbean Drive
Sunnyvale, CA 94089
(408) 745-1655

Touch-Sensitive Input Device

The Chalk Board PowerPad is an easy-to-use device that replaces the keyboard as a means of computer input.

The PowerPad has a 12-inch by 12-inch active surface that can handle input from multiple points.

The device, which can be used with the Commodore 64, VIC-20, Atari, Apple, and IBM computers, sells for \$99.95.

Selections from "Leonardo's Library" are designed to be used with the PowerPad. Programs

presently available include *Leonardo's Logo*, *Leo's 'Lectric Paintbrush*, and *Micro Maestro*. Programs from the library, which is expected to grow to as many as 30 selections, range in price from \$24.95 to \$49.95.

Miller Communications
607 Boylston St.
Copley Square
Boston, MA 02116
(617) 536-0470

New Product releases are selected from submissions for reasons of timeliness, available space, and general interest to our readers. We regret that we are unable to select all new product submissions for publication. Readers should be aware that we present here some edited version of material submitted by vendors and are unable to vouch for its accuracy at time of publication.

COMPUTE! welcomes notices of upcoming events and requests that the sponsors send a short description, their name and phone number, and an address to which interested readers may write for further information. Please send notices at least three months before the date of the event, to: *Calendar*, P.O. Box 5406, Greensboro, NC 27403.

POWERBYTE MENU BUSINESS AND HOME SOFTWARE

**Commodore 64 - Vic 20
TRS Color - Adam**

The Accountant	\$29.95	Utility Bills	14.95
Accts. Rec./Pay	26.95	Budgeting	15.95
Order Tracker	21.95	Screen Dump	12.95
Business Inventory	21.95	Calendar	16.95
The Bidder	18.95	Present Value	13.95
Calendar Data Base	16.95	Checkbook	12.95
Billing Solver	21.95	Home Budget	12.95
Client Ticker	21.95	Home Inventory	12.95
Vicky Calc	14.95	Cash Lerner	18.95
Cash Flow	16.95	Medical Records	18.95
Linear Regression	10.95	Credit Cards	15.95
Depreciator	18.95	Super Shopper	12.95
Bar Chart	9.95	Savings Accounts	13.95
Mortgage Calculator	9.95	Travel Time	13.95
Montage Composer	9.95	Tape Gen	14.95
P.E.R.T. My VIC	18.95	Tape Worm	14.95
Amortizer	24.95	Dear Diary	14.95
Taxman	18.95	Mother's Recipes	12.95
Loan Repayer	12.95	Metric Draw	12.95
Statistics	18.95	Track My Weight	14.95
Phone Directory	12.95	Jogger's Logger	14.95
Net Worth	12.95	Grade My Kids	16.95
Investments	14.95	Nutrient to Phenolic	18.95
Stock Ticker Tape	18.95	Lightning Sort	14.95
Profit Sharing Plan	18.95	Golf Scorecard	14.95
Syndicator	18.95	Disk A Magician	15.95
Melman	12.95	Terra Converter	9.95

Specify Cassette or Disk (Add \$5.00 Extra)
Check, C.O.D. or Charge (Add \$1.50 Post. & H.S.)

FREE CATALOG

Powerbyte Software
Box 579-905 Lorain Drive
Greensboro, NC 27403
604-424-5485

THRILL YOUR FRIENDS THIS CHRISTMAS



with a gift
from

bitCards
PERSONALIZED
SOFTWARE

Only \$18.50



Santa has disappeared. The player can solve the mystery using the available clues. Along the way he'll discover that this is no ordinary adventure game. In a storage room, he'll find a shimmering package addressed to him. And in Santa's coat pocket, a note signed by you. Santa's computer will call upon him by name to help solve the mystery. And each bitCard will contain your own personal greeting message—right in the program! And other surprises too.

A bitCard is the perfect gift for everyone on your list who has access to a micro. They'll love the graphics, the humor, the action sequences. And they'll love you for stuffing their stocking with this Christmas delight.

bitCards. A personalized greeting card. A gift that will be the hit of the season. Now isn't that better than a polka-dot tie?

16K cassette versions available for Commodore-64™ & Atari 400/800. 5K or 5K with 8K expansion versions for Vic 20™. Also available for Apple™ II™/e (HBK disk) and TRS-80™ models II™ & C. (HBK cassette)

ORDER INFORMATION BY PHONE (MasterCard or Visa required) call 1-800-555-1212 and ask for the TOLL FREE number for bitCARDS. BY MAIL: money order or MasterCard/Visa number & exp. date use separate sheet for each bitCard ordered. Give your name and address and following info about recipient: (1) name (2) address (3) computer & TRS-80 Model 1 (4) hoster phone number (item 4 optional). Also include your personal message to recipient (25 word max.) (We'll usually intended message if you prefer.) We'll call if you want bitCard sent to you or directly to friend. Order before Dec. 12. Send order or requests for info to bitCARDS, 129 S. University Dr., Suite F-2, Plantation, FL 33317

Eric Martin's

Where prices are born, not raised!



Atari 1400XL 64K CALL

Built-in phone modem,
expandable to 256K,
and more goodies

815 Disk Drive	CALL
1010 Program Recorder (NEW)	\$79.00
1505 Printer (NEW)	\$410.00
CX65 Numeric Keyboard	\$109.00
CX410 Bookkeeper Kit	CALL
CX480 Communicator Kit	CALL

ATARI Software

CALL 4025 Defender	\$39.00
1000025 Dig Dug	\$39.00
1000030 Eastern Front (ROM)	\$44.00
CLK 4027 Qix	\$39.00
1000031 Star Trek	\$39.00
CA15040 Visibasic	\$139.00
CA01022 Technical Reference Notes	\$29.95

Third Party Software

Minor 2049	CALL
Zaxxon	\$27.95
Eastern Front 1941 (cassette)	\$29.95
Wizard of War	\$30.00
Gart	\$30.00
Frogger	\$30.00
Chit Lifter	\$30.00
Apple Panic	\$32.75
Beta Buggies	\$32.75
Submarine Commander (ROM)	\$35.95
Jump Jet Pilot (ROM)	\$35.95
Sussex (ROM)	\$36.95
Generalist Football	CALL

When new ATARIS are born,
Eric Martin's will have them at
newborn prices. For the latest
from Atari, call or visit our store.
One of the largest Atari Dealers
in the U.S.

We take TRADE-INS.
Call for your price.



Orders shipped in 24 hours

For fast delivery, send certified or casher checks
money orders or direct bank wire transfers. Personal
checks allow 2 to 3 weeks to clear. Prices in Ohio only
discount and are subject to change. Add 2% for
credit card purchases. Shipping - Software \$2
Minimum. Hardware-call. Foreign orders invited
-add 15% for shipping. Ohio residents add 6%
sales tax.

Eric Martin's

5485 Warrensville Center Road
Maple Heights, Ohio 44137

Call Toll Free
1-800-482-7254
In Ohio 216/663-2032

Mon.-Sat. 10-6 EST

commodore SUPER-MART

HANNA ENTERPRISES

1303 Columbia Dr. Suite 207 Richardson, Texas 75081

TO ORDER CALL

(IN TEXAS) (OUTSIDE TEXAS)
214-231-2645 800-527-1738

MasterCard & Visa accepted — add 3% surcharge for credit cards

F.O.B. Dallas, Texas

9:30 a.m. - 6:30 p.m. (m-f) 10:30 a.m. - 2:30 p.m. sat.

COMMODORE COMPUTERS

B-128K-80	\$777.20
B-256K-80	\$878.13
BX-256K-80/dual drive	\$2805
PET 64 (educational)	\$627.50
6032	\$627.50
8096	\$678.25
9000 super pet	\$1071.25
c-64	\$233
Executive 64 portable	CALL

COMMODORE DISK DRIVES

1541 (170k)	\$250.50
2031	\$311
4040 (340k)	\$567.85
8050 (1mg)	\$881.90
8250 (2mg)	\$1228.50
9080 hard disk (5mg)	\$2040
9090 hard disk (7.5mg)	\$2290

COMMODORE PRINTERS

1525 (30cps)	\$238.75
1526 (100cps)	\$343.95
4023 CBM (100cps)	\$330.95
8023 (160cps)	\$537.95
6400 daisy wheel CBM	\$1417.75
new! 1520 plotter printer	\$178.50

COMMODORE PERIPHERALS

1701 color monitor	\$240.95
CBM 64k memory board	\$240.95
Super Pet upgrade board	\$486.95
Cables PET-IEEE	\$34.95
Cables IEEE-IEEE	\$42.95
Vic 1600 Modem	\$89
Vic 1650 Automatic Modem	\$109.95
Vic/64 (auto answer, dial)	\$150
1530 Datasette recorder	\$84.95

OTHER PRINTERS

Epson MX-80FT (dot Matrix)	\$455
Okidata 82+, 120 cps (serial & parallel, dot Matrix)	\$425
Star Gemini 10	\$320
Star Gemini 15	\$405
Diablo 620, 25 cps (letter quality)	\$949

COMMODORE SOFTWARE FOR CBM

Wordpro+ or 5+	\$305
Visicalc (Expanded)	\$195
BPI G/L A/R A/P Inv. etc	\$320 ea.
MANAGER (database)	\$195

COMMODORE c64 SOFTWARE

Easy script	\$48.95
Easy mail	\$48.95
Easy finance	\$48.95
The manager	\$48.95
NEW c64 110-cp/m 2.2	\$96.95
Super expander c64	\$29.95
Nevada Cobol	\$54.95
Logo	\$58.95
Pilot	\$58.95
Music machine	\$10.95
Music composer	\$19.95

SMALL c64 BUSINESS SYSTEMS

c64 General Ledger	\$48.95
Accounts Receivable	\$48.95
Accounts Payable	\$48.95
Payroll/Check Writing	\$48.95
Inventory Management	\$48.95
Codewriter	\$58.95

c64 RECREATION CARTRIDGE

Jupiter Lander	\$24.95
Kickman	\$24.95
Tooth Invaders	\$24.95
Omega Race	\$39.95
Wizard of War	\$34.95
Go!	\$34.95
Speed/Bingo Math	\$24.95

INTERFACES & ACCESSORIES

RS-232 printer interface (Okidata, Diablo)	\$58.95
Parallel interface	\$89.95
80 Column Expander	\$159.95
TEC typewriter/c64 com.	\$200.95
Vic Switch (Connect 8 64's or Vics to printer, drivers)	\$149
Super Card	CALL

CAPUTE!

Modifications Or Corrections To Previous Articles

Atari Caves Of Ice

Due to a problem with variable initialization, the Atari version of this game from the September issue (p. 60) provides more exits the longer the game is played. To insure there is always only one exit from the Caves, reader Jim Vail suggests that the `AS(750)="O"` in line 100 be changed to:

```
AS="O":AS(750)="O":AS(2)=AS:
```

Also, Ohio reader Neil Morris notes that the program can be modified to run in less than 16K of memory by changing the `GRAPHICS 8` in line 305 to `GRAPHICS 6`, then dividing all the numbers after the `PLOT` and `DRAWTO` commands in lines 32-85 by two (dropping any fractions).

VIC Diamond Drop

Some Commodore 64 color controls slipped into the VIC version of this game from the September issue (p. 84). For proper operation, change the `63` in line 50 to `{GRN}` (CTRL-6 for green) and the `73` in lines 100 and 102 to `{BLU}` (CTRL-7 for blue).

Mystery Spell For TI And VIC

The TI version of this educational game from September (p. 117) stores word lists properly to disk. However, tape users need to make the following changes:

```
1810 OISPLAY AT(23,1):"PLACE TAPE O
R OISK IN OERVICE" :: ACCEPT AT
(11,3):FS
1815 IF SEGS(FS,1,1)=""C" THEN 1842
ELSE OPEN #1:FS,INTERNAL,UPOAT
E,PIXEO 50
1842 IF J=0 THEN 1846
1844 OPEN #1:FS,OUTPUT,INTERNAL,PIX
ED 50 :: FOR I=1 TO 20 :: PRIN
T #1:BS(I) :: NEXT I :: CLOSE #
1 :: GOTO 230
1846 OPEN #1:FS,INPUT,INTERNAL,PIX
ED 50 :: FOR I=1 TO 20 :: INPU
T #1:BS(I) :: NEXT I :: CLOSE #
1 :: CALL CLEAR :: GOTO 1760
```

Also, there is a minor typo in the VIC version (p. 127). In line 2170, `LEFRTS` should be `LEFTS`.

VIC PILOT

There is a minor flaw in the turtle graphics feature of the `PILOT` interpreter in `BASIC` from the September issue (p. 166). If the turtle goes off the graphics screen during a loop, subsequent graphics commands are not interpreted properly. If you are using Program 1, make this change:

```
128 IFOS%=1THENPRINT"*PLOT WENT OFF SCREE
N":D=0
```

If you are using Program 2, the Super Expander version, make this change:

```
143 GOSUB127:IFOS%=1THEND=0:GOTO11
```

Cracking The Kernal

The instructions for using Kernal ROM routines to `LOAD` data from tape or disk into the 64 (September 1983, p. 270) are incorrect. The proper series of machine language instructions to `OPEN` logical file 2 from device 8 (disk) with secondary address 0 and `LOAD` a file into memory starting at address 8192 (\$2000) is:

```
LDA #502
LDX #508
LDY #500
JSR SETLFS
LDA #504
LDX #L,NAME
LDY #H,NAME
JSR SETNAM
LDA #500
LDX #500
LDY #520
JSR LOAD
RTS
```

NAME .BY 'FILE'

Note that the accumulator must be set to 0 for a `LOAD` and 1 for a `VERIFY`, not vice versa as stated in the article. Our thanks to Lewis Kleinsmith for pointing this out.

Atari Dragon

Program 2 (August 1983, p. 88) fails to leave the current score on the screen at the end of the game. To eliminate this minor flaw, Stuart Goldenberg suggests the following correction and addition:

```
410 COLOR 32:PLOT 0,0:DRAWTO 19,0:PL
OT 0,1:DRAWTO 10,1:POSITION 0,0:
? #6:"SCORE="SCORE":W
435 POSITION 0,0: ? #6: "(20 SPACES) "
```

TI Towers

The program for this article was renumbered before it was listed. As a result, the line numbers of the program do not agree with those mentioned in the article. However, the program will work as listed.

64 Ultrasort

When using Program 4 to test the 64 version of this machine language sorting routine (September 1983, p. 202), you should replace line 300 with:

```
300 SYS 49152,N,AA$(1)
```

The `REM` statement in line 291 is incorrect.

VIC Dots

In line 560 of this program from the September issue (p. 132), the spurious question mark should be removed. The first part of the line should read:

```
560 IFFNBX(ML+22)=...
```

Q

COMPUTE! Back Issues

Here are some of the applications, tutorials, and games from available back issues of **COMPUTE!**. Each issue contains much, much more than there's space here to list, but here are some highlights:

May 1981: Named GOSUB/GOTO in Applesoft, Generating Lower Case Text on Apple II, Copy Atari Screens to the Printer, Disk Directory Printer for Atari, Realtime Clock on Atari, PET BASIC Delete Utility, PET Calculated Bar Graphs, Running 40 Column Programs on a CBM 8032.

June 1981: Computer Using Educators (CUE) on Software Pricing, Apple II Hires Character Generator, Ever-expanding Apple Power, Color Bust for Atari, Mixing Atari Graphics Modes 0 and 8, Relocating PET BASIC Programs, An Assembler in BASIC for PET, QuadraPET: Multitasking!

July 1981: Home Heating and Cooling, Animating Integer BASIC Lores Graphics, The Apple Hires Shape Writer, Adding a Voice Track to Atari Programs, Machine Language Atari Joystick Driver, Four Screen Utilities for the PET, Saving Machine Language Programs on PET Tape Headers, Commodore ROM Systems, The Voracious Butterfly on OSI.

August 1981: Minimize Code and Maximize Speed, Apple Disk Motor Control, A Cassette Tape Monitor for the Apple, Easy Reading of the Atari Joystick, Blockade Game for the Atari, Atari Sound Utility, The CBM "Far 40," Keyword for PET, CBM/PET Loading, Chaining, and Overlaying.

October 1981: Automatic DATA Statements for CBM and Atari, VIC News, Undeletable Lines on Apple, PET, VIC, Budgeting on the Apple, Switching Cleanly from Text to Graphics on Apple, Atari Cassette Boot-tapes, Atari Variable Name Utility, Atari Program Library, Train your PET to Run VIC Programs, Interface a BSR Remote Control System to PET, A General Purpose BCD to Binary Routine, Converting to Far-40 PET.

December 1981: Saving Fuel \$5 (multiple computers: versions for Apple, PET, and Atari), Unscramble Game (multiple computers), Maze Generator (multiple computers), Animating Applesoft Graphics, A Simple Printer Interface for the Apple II, A Simple Atari Wordprocessor, Adding High Speed Vertical Positioning to Atari P/M Graphics, OSI Supercursor, A Look At SuperPET, Supermon for PET/CBM, PET Mine Maze Game.

January 1982: Invest (multiple computers), Developing a Business Algorithm (multiple computers), Apple Addresses, Lowercase with Unmodified Apple, Cryptogram Game for Atari, Superfont: Design Special Character Sets on Atari, PET Repairs for the Amateur, Micromon for PET, Self-modifying Programs in PET BASIC, Tiny-mon: a VIC Monitor, Vic Color Tips, VIC Memory Map, ZAP: A VIC Game.

May 1982: VIC Meteor Maze Game, Atari Disk Drive Speed Check, Modifying Apple's Floating Point BASIC, Fast Sort For PET/CBM, Extra Atari Colors Through Artifacts, Life Insurance Estimator (multiple computers), PET Screen Input, Getting The Most Out Of VIC's 5000 Bytes.

August 1982: The New Wave Of Personal Computers, Household Budget Manager (multiple computers), Word Games (multiple computers), Color Computer Home Energy Monitor, Intelligent Apple Filing Cabinet, Guess That Animal (multiple computers), PET/CBM Inner BASIC, VIC Communications, Keypoint Compendium, Animation With Atari, VIC Curiosities, Atari Substring Search, PET and VIC Electric Eraser.

September 1982: Apple and Atari and the Sounds of TRON, Commodore Automatic Disk Boot, VIC Joysticks, Three Atari GTIA Articles, Color Computer Graphics, The Apple Pilot/Language, Sprites and Sound on the Commodore 64, Peripheral Vision Exerciser (multiple computers), Banish INPUT Statements (multiple computers), Charades (multiple computers), PET Pointer Sort, VIC Pause, Mapping Machine Language, Editing Atari BASIC With the Assembler Cartridge, Process Any Apple Disk File.

January 1983: Sound Synthesis And The Personal Computer, Juggler And Thunderbird Games (multiple computers), Music And Sound Programs (multiple computers), Writing Transportable BASIC, Home Energy Calculator (multiple computers), All About Commodore WAIT, Superscan64, Perfect Commodore INPUTs, Atari Autonomer, Copy VIC Disk Files, Commodore 64 Architecture.

March 1983: An Introduction To Data Storage (multiple computers), Mass Memory Now And In The Future, Games: Closeout, Boggler, Fighter Aces, Letter And Number Play (all for multiple computers), VIC Music, Direct Atari Disk Access, TRS-80 Color Computer Data Base, Apple Subroutine

Capture, PET Quickplot, TI Graphics Made Easy, VIC and Atari Memory Management.

April 1983: Selecting The Right Word Processor, Air Defense (multiple computers), Scriptor: An Atari Word Processor, Retirement Planner (multiple computers), TI-99 Match-Em, Dr. Video For Commodore, Atari Filefixer, Video 80: 80 Columns For The Atari, VICword, Magic Commodore BASIC.

May 1983: The New Low Cost Printer/Plotters, Jumping Jack (multiple computers), Deflector (multiple computers), VIC Kaleidoscope, Graphics on the Sinclair/Timesex, Bootmaker For VIC, PET and 64, VICSTATION: A "Paperless Office," The Atari Musician, Apple Fast Sort, TI BASIC One-liners.

June 1983: How To Buy The Right Printer, The New, Low-cost Printers, Astrostorm (multiple computers), The Hawkmen Of Dindrin (multiple computers), MusicMaster For The Commodore 64, Commodore Data Searcher, Atari Player/Missile Graphics Simplified, TI Structured BASIC, UnNEW For The VIC and 64, Atari Fast Shuffle, VIC Contractor, Sinclair/Timesex Screen Splitter.

Home and Educational COMPUTING! (Full 1981 and Summer 1981 - count as one back issue): Exploring The Rainbow Machine, VIC As Super Calculator, Custom Characters, Alternate Screens, Automatic Line Numbers, Using The Joystick (Spacewar Game), Fast Tape Locator, Window, VIC Memory Map.

Back issues are \$3 each or six for \$15. Price includes freight in the US. Outside the US add \$1 per magazine ordered for surface postage. \$4 per magazine for air mail postage. All back issues subject to availability.

**In the Continental US call
TOLL FREE 800-334-0868
(In NC Call 919-275-9809)**

Or write to **COMPUTE!** Back Issues, P.O. Box 5406, Greensboro, NC 27403 USA. Prepayment required in US funds.

MasterCard, Visa and American Express accepted. North Carolina Residents add 4% sales tax.

A Beginner's Guide To Typing In Programs

What Is A Program?

A computer cannot perform any task by itself. Like a car without gas, a computer has *potential*, but without a program, it isn't going anywhere. Most of the programs published in **COMPUTE!** are written in a computer language called BASIC. BASIC is easy to learn and is built into most computers (on some computers, you have to purchase an optional BASIC cartridge).

BASIC Programs

Each month, **COMPUTE!** publishes programs for many machines. To start out, type in only programs written for your machine, e.g., "TVersion" if you have a TI-99/4. Later, when you gain experience with your computer's BASIC, you can try typing in and converting certain programs from one computer to yours.

Computers can be picky. Unlike the English language, which is full of ambiguities, BASIC usually has only one "right way" of stating something. Every letter, character, or number is significant. A common mistake is substituting a letter such as "O" for the numeral "0", a lowercase "l" for the numeral "1", or an uppercase "B" for the numeral "8". Also, you must enter all punctuation such as colons and commas just as they appear in the magazine. Spacing can be important. To be safe, type in the listings *exactly* as they appear.

Brackets And Special Characters

The exception to this typing rule is when you see the curved bracket, such as "[DOWN]". Anything within a set of brackets is a special character or characters that cannot easily be listed on a printer. When you come across such a special statement, refer to the appropriate key for your computer. For example, if you have an Atari, refer to the "Atari" section in "How to Type **COMPUTE!**'s Programs."

About DATA Statements

Some programs contain a section or sections of DATA statements. These lines provide information needed by the program. Some DATA statements contain actual programs (called machine language); others contain graphics codes. These lines are especially sensitive to errors.

If a single number in any one DATA statement is mistyped, your machine could "lock up," or "crash." The keyboard, break key, and RESET (or STOP) keys may all seem "dead," and the screen

may go blank. Don't panic - no damage is done. To regain control, you have to turn off your computer, then turn it back on. This will erase whatever program was in memory, so always SAVE a copy of your program before you RUN it. If your computer crashes, you can LOAD the program and look for your mistake.

Sometimes a mistyped DATA statement will cause an error message when the program is RUN. The error message may refer to the program line that READs the data. *The error is still in the DATA statements, though.*

Get To Know Your Machine

You should familiarize yourself with your computer before attempting to type in a program. Learn the statements you use to store and retrieve programs from tape or disk. You'll want to save a copy of your program, so that you won't have to type it in every time you want to use it. Learn to use your machine's editing functions. How do you change a line if you made a mistake? You can always retype the line, but you at least need to know how to backspace. Do you know how to enter inverse video, lowercase, and control characters? It's all explained in your computer's manuals.

A Quick Review

- 1) Type in the program a line at a time, in order. Press RETURN or ENTER at the end of each line. Use backspace or the back arrow to correct mistakes.
- 2) Check the line you've typed against the line in the magazine. You can check the entire program again if you get an error when you RUN the program.
- 3) Make sure you've entered statements in brackets as the appropriate control key (see "How To Type **COMPUTE!**'s Programs" elsewhere in the magazine.)

*We regret that we are no longer able to respond to individual inquiries about programs, products, or services appearing in **COMPUTE!** due to increasing publication activity. On those infrequent occasions when a published program contains a typo, the correction will appear on the **COMPUTE!** page, usually within eight weeks. If you have specific questions about items or programs which you've seen in **COMPUTE!**, please send them to Readers Feedback, P.O. Box 5406, Greensboro, NC 27403.*

How To Type COMPUTE!'s Programs

Many of the programs which are listed in **COMPUTE!** contain special control characters (cursor control, color keys, inverse video, etc.). To make it easy to tell exactly what to type when entering one of these programs into your computer, we have established the following listing conventions. There is a separate key for each computer. Refer to the appropriate tables when you come across an unusual symbol in a program listing. If you are unsure how to actually enter a control character, consult your computer's manuals.

Atari 400/800

Characters in inverse video will appear like: **ESC** **CTRL** **DEL**. Enter these characters with the Atari logo key. (A)

When you see	Type	See
(CLEAR)	ESC SHIFT <	Clear Screen
(UP)	ESC CTRL -	Cursor Up
(DOWN)	ESC CTRL =	Cursor Down
(LEFT)	ESC CTRL +	Cursor Left
(RIGHT)	ESC CTRL -	Cursor Right
(BACK S)	ESC DELETE	Backspace
(DELETE)	ESC CTRL DELETE	Delete character
(INSERT)	ESC CTRL INSERT	Insert character
(DEL LINE)	ESC SHIFT DELETE	Delete line
(INS LINE)	ESC SHIFT INSERT	Insert line
(TAB)	ESC TAB	TAB key
(CLR TAB)	ESC CTRL TAB	Clear tab
(SET TAB)	ESC SHIFT TAB	Set tab stop
(BELL)	ESC CTRL 2	Ring buzzer
(ESC)	ESC ESC	Escape key

Graphics characters, such as CTRL-T, the ball character ● will appear as the "normal" letter enclosed in braces, e.g. (T).

A series of identical control characters, such as 10 spaces, three cursor-lefts, or 20 CTRL-R's, will appear as (10 SPACES), (3 LEFT), (20 R), etc. If the character in braces is in inverse video, that character or characters should be entered with the Atari logo key. For example, (M) means to enter a reverse-field heart with CTRL-comma, (5M) means to enter five inverse-video CTRL-U's.

Commodore PET/CBM/VIC/64

Generally, any PET/CBM/VIC/64 program listings will contain words within braces which spell out any special characters: (DOWN) would mean to press the cursor down key. (5 SPACES) would mean to press the space bar five times.

To indicate that a key should be *shifted* (hold down the SHIFT key while pressing the other key), the key would be underlined in our listings. For example, S would mean to type the S key while holding the shift key. If you find an underlined key enclosed in braces (e.g., (10 N)), you should type the key as many times as indicated (in our example, you would enter ten shifted N's). Some graphics characters are inaccessible from the keyboard on CBM Business models (32N, 8032).

For the VIC and 64, if a key is enclosed in special brackets, { > }, you should hold down the Commodore key while pressing the key inside the special brackets. (The Commodore key is the key in the lower left corner of the keyboard.) Again, if the key is preceded by a number, you should press the key as many times as indicated.

Rarely, you'll see in a Commodore 64 program a solitary letter of the alphabet enclosed in braces. These characters can be entered by holding down the CTRL key while typing the letter in the braces. For example, (A) would indicate that you should press CTRL-A.

About the *quote mode*: you know that you can move the cursor around the screen with the CURSR keys. Sometimes a programmer will want to move the cursor under program control. That's why you see all the (LEFT)'s, (HOME)'s, and (BLU)'s in our programs. The only way the computer

can tell the difference between direct and programmed cursor control is the quote mode.

Once you press the quote (the double quote, SHIFT-2), you are in the quote mode. If you type something and then try to change it by moving the cursor left, you'll only get a bunch of reverse-video lines. These are the symbols for cursor left. The only editing key that isn't programmable is the DEL key; you can still use DEL to back up and edit the line. Once you type another quote, you are out of quote mode.

You also go into quote mode when you INSRT spaces into a line. In any case, the easiest way to get out of quote mode is to just press RETURN. You'll then be out of quote mode and you can cursor up to the mistyped line and fix it.

Use the following tables when entering special characters:

When You Read:	Press:	See:	When You Read:	Press:	See:
(CLEAR)	SHIFT	CLR/HOME	(GRN)	CTRL	6
(HOME)		CLR/HOME	(BLU)	CTRL	7
(UP)	SHIFT	CURSR ↑	(YEL)	CTRL	8
(DOWN)		CURSR ↓	(P1)		1
(LEFT)	SHIFT	CURSR ←	(P2)		2
(RIGHT)		CURSR →	(P3)		3
(RVS)	CTRL	9	(P4)		4
(OFF)	CTRL	0	(P5)		5
(BLK)	CTRL	1	(P6)		6
(WHT)	CTRL	2	(P7)		7
(RED)	CTRL	3	(P8)		8
(CYN)	CTRL	4			9
(PUR)	CTRL	5			0

All Commodore Machines

Clear Screen (CLR)	Cursor Left (LEFT)
Home Cursor (HOME)	Insert Character (INST)
Cursor Up (UP)	Delete Character (DEL)
Cursor Down (DOWN)	Reverse Field On (RVS)
Cursor Right (RIGHT)	Reverse Field Off (OFF)

Apple II / Apple II Plus

All programs are in Applesoft BASIC, unless otherwise stated. Control characters are printed as the "normal" character enclosed in brackets, such as (D) for CTRL-D. Hold down CTRL while pressing the control key. You will not see the special character on the screen.

Texas Instruments 99/4

The only special characters used are in PRINT statements to indicate where two or more spaces should be left between words. For example, ENERGY (10 SPACES) MANAGEMENT means that ten spaces should be left between the words ENERGY and MANAGEMENT. Do not type in the braces or the words 10 SPACES. Enter all programs with the ALPHA LOCK on (in the down position). Release the ALPHA LOCK to enter lowercase text.

1/2 PRICE INTRODUCTION

VIC • C-64 • TI-99

Spreadsheet	19.95
File Manager	19.95
Word Processor	14.95
Payroll	14.95
Mailing List	14.95
Inventory	14.95
Statistics	14.95
Personnel File	14.95
Checkbook	9.95
Budget	9.95

California Residents add 6.5% Tax
For FREE Catalog Write



Valorum
441 Clyde Ave. A
Mtn. View, CA 94043
(415) 968-8500

ME24K

24K RAM memory
expansion unit for
Commodore Vic 20™

**\$94.99 + \$3.00 for
shipping and handling**

Address orders and inquiries to:



**Computer
Techniques**

P.O. Box 80756
Sioux Falls, S.D. 57116

Vic 20 is a trademark of
Commodore Electronics Ltd.

**NEW!
UPDATE
YOUR ATARI®
KEYBOARD WITH
GRAPH-FIX™ KEYBOARD**

- Convenient
- Saves Time
- Fits All Models
- Improves Accuracy
- 29 Pre-and-Stick Symbols to Label each Graphics Key

TO ORDER send \$5.95 check or money order
(Texas residents add 5% sales tax)

DOVESTAR CREATIVE CONCEPTS
P.O. Box 2099, Dept. 3113, Nederland, Texas 77627
(409) 727-9978 (no collect calls please) or
MASTERCARD and VISA customers call Toll-Free
Monday-Friday 9 a.m. - 5 p.m. Central Time Zone -
1-800-534-7383 (In Texas 1-800-292-5098)
After dialing, get a second dial tone, WAIT for operator
and ask for "EXTENSIVE TRAINING AIDS"

DEALER INQUIRIES RECOMMENDED!
From TM of Atari, Inc.

GIVE YOURSELF ONE FOR CHRISTMAS!

VIC-20

MATH MENACE\$9.00
Kids fight off alien invaders while drilling in
ADDITION, SUBTRACTION, MULTI-
PLICATION and DIVISION.

BLACKJACK\$9.00
GREAT GRAPHICS! Las Vegas style
All options Split Pairs, Double Down,
etc.

LETTER WRITER\$9.00
For use with your VIC PRINTER

CHARACTER DESIGNER\$9.00
Design CUSTOM CHARACTERS for
use in your own game programs

- * ALL PROGRAMS RUN ON UNEXPANDED
VIC! (35K)
- * BUY ALL 4 PROGRAMS FOR \$30.00 AND
RECEIVE A BONUS PROGRAM FREE!
ADD \$1.00 FOR POSTAGE

MarshMallow Software
Box 3810 Bozeman, MT 59712

VIC-20 Trademark of Commodore Business Machines

KINDER CONCEPTS

30 PROGRAMS FOR KINDERGARTEN CHILDREN
READING READINESS, MATH CONCEPTS,
PERCEPTION, COLORS, SHAPES, ETC.
Disks \$39.50 for 5 programs*
All 30 on 1 disk with Backup -- \$175.00

For COMMODORE PET* and 64,**
and APPLEII+.

We also carry "Master Grades" - Multiple Choice
"Football Scout" and other useful programs for
teachers.

Please add \$2.00 per disk for shipping & handling

MIDWEST SOFTWARE

Box 214 • FARMINGTON, MI 48024
Phone: 313-477-0807 (4:00 pm - 11:00 pm)

Please send for complete descriptions and ordering
information.

- * Sample disk with 2 programs for \$10.00
- ** and TM trademarks of Commodore Business Machines
and Apple Computer Company

CREATIVE FINANCE FOR THE C-64

A FULL feature finance system that is truly
PERSONAL. Check these Features!!

- Keeps running totals of savings, charges,
loans, etc.
- Stores all transactions for a complete record
system
- Sorts by 24 categories (easily expanded to
100 if you like)
- Sorts out tax deductible items
- Complete budgeting system.
- Easy and quick to use.

Best of all, CREATIVE FINANCE comes with a
program listing and complete instructions on
how to tailor the system to YOUR personal
needs. Disk system only!

Send check or money order for \$34.95 to

Creative Image
P.O. Box 9, Green Bay, WI. 54305



STOCK HELPER™

Commodore 64

Stock HELPER is a tool to maintain a history
of stock prices and market indicators
on diskette, to display charts, and to calculate
moving averages. Stock HELPER was designed
and written by a "weekend investor" for other weekend investors.
Stock HELPER is available for \$30.00
U.S. or \$37.00 Canadian plus shipping.

(M)agreable software, inc.
5925 Magnolia Lane • Plymouth, MN 55442
(612) 559-1108

HELPER is a trademark of (M)agreable Software, Inc.
Commodore is a trademark of Commodore Electronics Ltd.

VIC-20 USERS CARTRIDGE BACK-UP

- PROTECT YOUR INVESTMENT
- BACK-UP YOUR CARTRIDGES ONTO
CASSETTE OR DISK
- SAVES WEAR ON YOUR CARTRIDGES AND
THE MEMORY PORT
- BACKED-UP CARTRIDGES RUN LIKE
ORIGINALS (8K RAM REQUIRED)
- SYSTEM IS AN EASY TO USE PROGRAM AND
A HIGH QUALITY CARTRIDGE INTERFACE
BOARD

\$49.95 POST PAID

CASSETTE BACK-UP

- PROTECT YOUR INVESTMENT
- BACK-UP ANY CASSETTE TAPE ONTO TAPE
OR DISK
- EASY TO USE PROGRAM
- REQUIRES NO USER MEMORY

\$19.95 POST PAID

VISA/MASTERCARD ORDERS:
PHONE (215) 289-4803
SEND CHECK OR MONEY ORDER TO:
E M TECHNOLOGIES
P.O. BOX 185
DOWNTOWN, PA. 19335
PA. RESIDENTS ADD 6%
6 MONTH REPLACEMENT GUARANTEE

FREE FREE FREE for C64/V20*

One 3 piece set of the finest quality, hand
made computer covers for the C64/V20*,
printer and disk drive. A \$23.95
value! When you enter your one year
subscription to **SOFTYPE**. Why spend hours
of typing? Avoid frustrations!!! Let **SOFTYPE**
do it for you! - for as little as \$3.99, we will
send you one menu driven tape or diskette**
a month with all the public domain programs
for your C64/V20* printed in the monthly
issues of this magazine. Order
now!!!, before the Christmas rush

- ☐ C64* 1 year subscription to **SOFTYPE**
- ☐ V20** (with FREE covers) \$47.88
- ☐ Set of three covers Only \$23.95
(Texas add 6% sales tax)
- ☐ One month of **SOFTYPE** \$3.99

**Add \$1.00 for disk version per month
Send check or money order to
SOFTYPE
1807 Cobble Creek
Houston, Texas 77073

*TRADEMARK OF COMMODORE BUSINESS MACHINES
YOU PAY ONLY FOR THE SERVICE AND TAPE
THE PROGRAMS ARE FREE



The Banner Machine™ — \$49.95

- For the Commodore 64, tape or disk (5 track)
- For the VIC-20 with 256 memory and disk
- For the TI-99/4A & TI with 256K tape or 48K disk
- Prints on any Epson RX, FX, or MX with Centrix, IBM 1520, Corona JRE, or 8000 Plotter
- 100% graphics printed at black graphics
- No on-disk graphics printed at black graphics
- Makes tapes up to 13" tall by any length (TOS-90, TOS-90, TOS-90)
- Makes headers of variable width up to 12 inch
- 5 cases of letters from 1/2" to 3/4" high (TOS-90, 3000)
- Proportional spacing
- Automatic centering, Right and left margins, Tab
- Specialty equipment and configurations when ordering

Cardinal Software

Vaporware Micro Systems

3948 Jeff Davis Highway

Woodbridge, Virginia 22093

Phone (703) 451-6508



DISK DUPLICATOR FOR COMMODORE SINGLE DISK DRIVES

(1540, 1541 and 2031 used with a VIC-20, Commodore 64, CBM 4000 or CBM 8000 computer)

DISK DUPLICATOR provides you a fast and easy way to make back-up copies of your precious, irreplaceable diskettes. Enjoy the convenience of a dual disk drive without the expense. DISK DUPLICATOR is 100% MACHINE LANGUAGE, 100% FAST, and most importantly, 100% AFFORDABLE! Don't let an accident or mistake catch you without back-up copies of all your diskettes. ORDER "DISK DUPLICATOR" TODAY at the special introductory price of only \$14.95 postage paid (check or money order only please).

H&H ENTERPRISES DEPT. 123C
5056 NORTH 41st STREET
MILWAUKEE, WISCONSIN 53209

GAMBLERS

T1-99/4A PROGRAMS

Practice "Texas Hold'em". A poker game that's the rage of the gambling casinos and card rooms. Written in standard basic by a gambler for a gambler. You can bet, check, fold and analyze what hand is needed to win the pot. Why play against the house?

"Hold'em" is played at tables provided by the casinos. Practice at home then have the edge when you go to a casino or card room.

Also available "Kenon". Practice the game with the big money payoff. Other casino games available soon.

Send \$21.95 check or m.o., \$2.00 shipping for each cassette and instructions. Washington residents add \$1.60 sales tax.

GAMBLERS HELPER

HOUSE OF SOFTWARE

P.O. BOX 2797

TRI-CITIES, WA 99302

"THE GAMBLERS FRIEND"

HOME BUDGET FOR COMMODORE 64

COMPLETE system for planning and tracking your home budget.

RECORD tax deductible items, bank charges, deposits & expenses

RECALL data by category, month and amount

CALCULATION of all balances

POWERFUL tax tool

EASY to use documentation

MENU driven with PRINTER option

\$29.95

SPECIFY TAPE OR DISK

RMC SYSTEMS CO., INC.

244 Scherr Hill

Berlin Springs, MI 49103

(616) 683-6829

Dealer inquiries invited.

Commodore 64 is a registered trademark of Commodore Business Machines.

DISKETTES

\$1.35

100% CERTIFIED

~ TO ORDER CALL

1-800-322-0ATA

DISCOUNT DATA SUPPLY

P.O. 02183

PORTLAND, OR 97202

LIMIT 100 DISKETTES PER ORDER

T1 99/4A

ENHANCE YOUR CHILD'S MUSIC EDUCATION

with fun skill-building games.

Sound, color graphics —

Progressing levels of play.

Levels 1-3

"Notes In A Nutshell"—5 finger patterns

"Collopy and Lemons"—Note names

"Create a Creature"—Sightreading groups

"Six with a Count"—Note values

Levels 2-4

"Artesian Escape"—8th or 16th note patterns

"On the Beating Path"—6th rhythm or 16th notes

"Extra-terrestrial Rescue"—Order of sharps or flats—(Joystick required)

"Pizza Go Round"—Major keys (Joystick required)

"One with Dragons"—Minor keys

Disk or Cassette —

EXTENDED BASIC REQUIRED

\$15.95 plus \$1.50 Shipping

Colorado residents add 4% tax

SOUNDWARE

P.O. Box 7026, Contract Stat. #6

Littleton, CO 80123

SAVE ON SOFTWARE

UP TO 30% OFF LIST FOR

THE COMMODORE 64

ATARI 400/800/1200

VIC 20 • APPLE • TI99/4A

ALSO AVAILABLE AT LOW PRICES!

GAME CARTRIDGES FOR COLECO

VISION AND ATARI 2600 AND 3200

MOVIES FOR VHS OR BETA UNITS.

Write for our FREE Catalog

ENCORE
VIDEO software



354 Lancaster Ave., Suite 212

Haverford, PA, 19041

SOFTWARE COMMODORE 64

The Staff Polyphonic Music Editor & generator. Enter up to 96 measures of 3 part harmony on any to use graphic display. Disk \$22.95 for 64, \$15.95 for VIC. Tape \$15.95 for 64, \$11.95 for VIC. Add \$1.50 for Postage and Handling.

We have a large selection of software for the 64—Word Processors, DTP, Base, Marine List, Accounting, Pick-up, Sprung, Bunt, Education, Applications, Home and Personal Record Keeping, Programmers Aids, Games.

ASK FOR FREE CATALOG

Check or Visa, MasterCard accepted

PROFESSIONAL MICRO SERVICE

100 W. 22nd St., Baltimore, MD 21218

301-366-0010

Dealer inquiries invited.



Replacement Ribbon

Manufactured by Aspen Ribbons, Inc. Buy direct from manufacturer & save.

Standard ink colors are black, Red, green, blue, brown, & purple colors are available for \$2.00 extra per ribbon.

PRICES

Centronics® 152-2 \$3.75 to \$6.50 ea.

Price depends on quantity ordered.

CALL FOR FREE CATALOG.

*Aspen Ribbons, Inc. is not affiliated with any company mentioned in this ad.

Aspen Ribbons, Inc. 1700 N. 55th St.

Bozeman, CO 83001-2788 (303) 444-4064

Telex 45-0955 E. User 800-525-0546

Wholesale 800-525-9966

GET THE MOST FROM YOUR VIC-20/C64

CASSETTE INTERFACE

THE NEW STANBACH CASSETTE INTERFACE CONNECTS TO THE CASSETTE PORT OF YOUR VIC-20 OR C64. IT ALLOWS THE CASSETTE MOTOR TO BE USED FOR BACKUPS. IT CAN BE USED TO ACCESS DATA TO BE RECOVERED. IT IS THE BEST WAY TO USE THE CASSETTE PORT FOR BACKUPS. ADD \$2.00 FOR SHIPPING. CIRCLE 55 CANADA, MEXICO



THE MODERN INTERFACE

CONNECTS TO THE VIC-20 OR C64. IT HAS A 100% SUCCESS RATE. IT IS THE BEST WAY TO USE THE CASSETTE PORT FOR BACKUPS. ADD \$2.00 FOR SHIPPING. CIRCLE 55 CANADA, MEXICO



CHARGE OR CDD ORDERS CALL

1-800-227-3800

ASK FOR OPERATOR 225

BYE SIZE

NO BOX \$2.99 SHIP/DIM SEATTLE, WA 98101 BUSINESS DAY ONLY. CIRCLE 56 CANADA, MEXICO

R.I.S.T. Inc. ANNOUNCES

SPEECH SYNTHESIZER SALE

\$59.95

ACT NOW

Phone: Telex Program 15 VALUE FREE Speech Synthesizer, Manual, 150 V-LUT FREE

ORDER NOW

Apple II, II+

TR580 Models I, III
Commodore 64, VIC 20
ZX80/81 and TS1000

Regularly \$89.95

Now Only \$59.95 + \$4.00 w/h/d

Complete or Starter Kit Available

*** 10 Day Money-Back Guarantee ***
Send check or M.O. COD add \$1.95 to R.I.S.T. Inc.
Dept. C-10 P.O. Box 499 Ft. Hamilton Station
Brooklyn, NY 11208 212-254-1954
N.Y.S. RESIDENTS ADD 4.5% TAX

FREE CATALOG!

HOME, EDUCATIONAL, AND BUSINESS SOFTWARE FOR THE VIC AND 64

New Items....

Mailing List/64 Disk features sorting and mailing labels. \$16.00

Typing Practice Improves typing speed and accuracy. 64/disk \$8.00

VIC/TAPE \$6.00

Over 50 other titles!
Low-Priced! Practical!

Put your VIC or 64 to work with quality software from

Farthest Fringe S.A.
101 Highway Blvd.
N. Pekin, IL 61554

EXCALIBUR ENTERPRISES

carries
SOFTWARE
for your

- Commodore 64
- VIC-20
- Texas Instruments 99-4/A
- Timex Sinclair 1000
- Atari Home Computers

Official Company and Third Party Software Hardware Peripherals Also Available

For Your FREE Catalog
Circle Reader Card Number
Available in the Advertiser Index
or Write

Excalibur Enterprises

Dept. N83
Box 4775
Riverside, CA 92514
(714) 359-8567



VIC

32K STATIC RAM \$99
4 SLOT BUSS EXPANDER \$44
DIRECT CONNECT MODEM \$99
PROM BURNER
2716, 2732, 2764, 27128 \$59

COMMODORE

DIRECT CONNECT MODEM \$99
7 SLOT BUSS EXPANDER \$89
BUFFERED EPROM BOARD \$89

WRITE FOR MORE INFO
IBM APPLE CBM COMPATIBLE
PRODUCTS AND BARE BOARDS

BAZ ELECTRONICS
PO BOX 4895
FEDERALWAY, WASH 88003
800-856-8020
VISA MASTERCARD

VIC 20/COMMODORE 64 ASSEMBLER

- 8 disk/Assembler Monitor Package
- Full Featured Assembler
- Outstanding Machine Language Text Editor
- Complete Machine Language Monitor including: Hex Dump, Disassembler, Load, Save, Change, Trace, etc. indispensable for Assembly Language debugging
- Full Documentation
- Fully Copyable

PRICE \$50.00 (U.S. FUNDS) COMPLETE, DISK OR CASSETTE

Minimum 64K Memory Expander required on VIC 20

VIC 20/8K 16K 24K 32K add on

memory Commodore 64

Disk Cassette

Name

Address

City State Zip

Send Check or Money Order to:

(Allow 3 weeks for checks)

MICOL Systems

P.O. Box 5150

Whitaker, CA 95075-5150

MICOL

Quality Systems Software

DEALER INQUIRIES WELCOME

WORDPROCESSING FOR THE VIC-20 AND C-64



Be more creative and efficient by using the Scotch's easy-to-learn menu-driven features. Within minutes use:

- Move
- Delete
- Word wrap
- Formatted printing: Margin adjust right justify Single, double or triple space
- With some printers: graphics, underlines, and special characters
- Screen edit
- Up to 10 tabs
- Search and replace
- Spell/proofing
- 1024 color combinations

For a limited time you can obtain the Scotch at

a Special Introductory Price:

\$20.00 (Specify 16K

or 24K version) \$16.95

Commodore 64 version \$19.95

Add \$3.00 for discs. Specify your type and model printer.

Send a check or money order (including \$3.00 for mailing fee)

Scotch Associates

P.O. Box 22645, Dayton, OH 45426

Allow 2 weeks for personal checks

Ohio residents add 5% sales tax

VIC-20 and C-64 are trademarks of Commodore Business Machines, Inc.

Dealer inquiries welcomed

SAVE MORE THAN EVER ON 3M Scotch DISKETTES!



\$1.95 5 1/4" D5DD
Qty 20
\$2.70 5 1/4" D5DD
Qty 20

5 1/4" D5DD (96TP) (746) \$2.65 ea

5 1/4" D5DD (96TP) (747) \$3.55 ea

(Specify soft 10 or 16 sector)

8" D5DD (746) \$2.97 ea

8" D5DD (746) \$2.94 ea

8" D5DD (746) \$3.30 ea

(Specify soft or 32 sector)

Save even more on quantity orders!

Minimum Order: 20 diskettes. Add \$3.00 shipping

per 200 diskettes. C.O.D. charge \$1.00 additional

VISA • Mastercard • Checks

For fast service, call

DISK WORLD!

Nationwide: 1-800-821-8627

In Illinois: 312-944-2780

Suite 400 • 30 East Huron Street • Chicago, Illinois 60611

Authorized Distributor Information Processing Products



And now for your Powerful Utility Software for creating

64, Note Pro

Call

301-366-8136

VISA/MC

- ★ MUSIC
- ★ SOUND EFFECTS
- ★ HI-RES GRAPHICS

Note Pro I—Starter sound and music editor. Tape-\$24.95, Disk-\$27.95

Note Pro II—Advanced sound and music editor. Tape-\$46.95, Disk-\$49.95

Note Pro Bridge—Copyable machine language routines which can be added to your programs to give high speed disk control and play or Note Pro files. Tape-\$24.95, Disk-\$27.95

Note Pro III—Hires drawing board with hires screens in your own programs. Tape-\$14.95, Disk-\$17.95

Call

301-366-8136

VISA/MC

Call

301-366-8136

VISA/MC

Call

301-366-8136

VISA/MC

Call

301-366-8136

VISA/MC

Call

301-366-8136

VISA/MC

Call

Note Pro I—Starter sound and music editor. Tape-\$24.95, Disk-\$27.95

Note Pro II—Advanced sound and music editor. Tape-\$46.95, Disk-\$49.95

Note Pro Bridge—Copyable machine language routines which can be added to your programs to give high speed disk control and play or Note Pro files. Tape-\$24.95, Disk-\$27.95

Note Pro III—Hires drawing board with hires screens in your own programs. Tape-\$14.95, Disk-\$17.95

Note Pro I—Starter sound and music editor. Tape-\$24.95, Disk-\$27.95

Note Pro II—Advanced sound and music editor. Tape-\$46.95, Disk-\$49.95

Note Pro Bridge—Copyable machine language routines which can be added to your programs to give high speed disk control and play or Note Pro files. Tape-\$24.95, Disk-\$27.95

Note Pro III—Hires drawing board with hires screens in your own programs. Tape-\$14.95, Disk-\$17.95

Note Pro I—Starter sound and music editor. Tape-\$24.95, Disk-\$27.95

Note Pro II—Advanced sound and music editor. Tape-\$46.95, Disk-\$49.95

Note Pro Bridge—Copyable machine language routines which can be added to your programs to give high speed disk control and play or Note Pro files. Tape-\$24.95, Disk-\$27.95

Note Pro III—Hires drawing board with hires screens in your own programs. Tape-\$14.95, Disk-\$17.95

Note Pro I—Starter sound and music editor. Tape-\$24.95, Disk-\$27.95

Note Pro II—Advanced sound and music editor. Tape-\$46.95, Disk-\$49.95

Note Pro Bridge—Copyable machine language routines which can be added to your programs to give high speed disk control and play or Note Pro files. Tape-\$24.95, Disk-\$27.95

Note Pro III—Hires drawing board with hires screens in your own programs. Tape-\$14.95, Disk-\$17.95

Order Today

Dealer Inquiries Welcomed

Electronic Industries

P.O. Box 7187

100 W. 22nd Street

Bethesda, MD 20814

Free Brochure!

Order Today

Dealer Inquiries Welcomed

Electronic Industries

P.O. Box 7187

100 W. 22nd Street

Bethesda, MD 20814

Free Brochure!

BEAT THE HIGH COST OF SOFTWARE

Before you buy any more software, you owe it to yourself to join **SOFTTRADERS™** - the fastest growing worldwide trading network. Members swap software and info for all computers.

Annual membership includes:

- Quarterly trading directories
- Monthly and flash updates
- Personalized trader listings
- Trader support systems
- Plus much more

Imagine having access to hundreds, even thousands of programs, each costing no more than the price of a stamp or phone call. Join now to beat the price increase and find out about the new member \$5 offer. \$49.95 U.S. \$64.95 FOREIGN. SAVE for info. Indicate computer model.

SOFTTRADERS™ INTERNATIONAL

1630 Shomaker Dr.
Murphyboro, IL 62966

ATARI AND VIC-20

CONFRONTATION AT VEGA THREE. The spacewar strategy-adventure game that transforms your computer into a spaceship. Realistic tactical displays, intelligent enemy ships and full-blown command logic make this one a galactic commander's dream! (16K required) \$12.95 on cassette. Price of one X-Parol, Pickups, and Baller (no expansion required) \$5.50 on cassette.

Send check or M.O. to
Cedar Island Software
P.O. Box 51545
Jacksonville Beach, FL 32250

Prices include postage/handling. Florida residents add 5% sales tax. Atari and VIC-20 are registered trademarks.



FLY Your Computer

Sky Pilot (BK VIC-20)	\$18.00
Runway 90 (16K VIC-20)	\$25.00
Runway 64	\$25.00
Micro-Pilot (EPSON HX-80)	\$18.00

ADD \$20* FOR DISK VERSION

TORPEDO!

Submarine Battle Games
BK VIC-20 or Commodore 64 \$25.00

SUSIE SOFTWARE

709 Wilshire Dr. Mt. Prospect, IL 60056
(312) 394-5165

HAVING LOADING PROBLEMS ?



GET A Z-DUBBER

Instead of the great frustration of cassette recording used with the 1541 or 1550, the Z-Dubber is a simple, easy-to-use device that allows you to load and save programs directly to disk. It's a Z-Dubber that connects to the front of the cassette and the computer. It's a Z-Dubber that allows you to load and save programs directly to disk. It's a Z-Dubber that allows you to load and save programs directly to disk. It's a Z-Dubber that allows you to load and save programs directly to disk.

CHARGE OR COD ORDERS CALL

1-800-227-3800

ASK FOR OPERATOR 229

BYTESIZE PO BOX 12307 DENVER, CO 80202
SEATTLE, WA 98101
800-227-3800 (229) 229-8798

CALL OR WRITE FOR DEALER INFORMATION

JUKI 6100

LETTER QUALITY PRINTER



• \$499.

- 16 cps
- Word processing and graphic functions
- Proportional spacing control
- Uses IBM Selectric ribbons
- Compatible with Kaypro, IBM, Apple, Osborne, and others.

Free shipping in U.S.

COMPUTERS and more

2420 University Ave., To Order
San Diego, CA 92104 (619) 291-1412

SAVE 35%, 50% OR MORE

on your computer purchase.

Dealer close-out on micro, printers, programs, and accessories.

FOR EXAMPLE	RETAIL	PRICE
IBM 4022 Printer	695.00	395.00
Smith Corona TPI	995.00	595.00
IBM 64K Expansion	500.00	295.00
EPSON A/R	495.00	195.00
Engle III	4995.00	3095.00
DeVidec 83A Printer	995.00	545.00

DESCRIPTION	Your Price	Save
NEC 9" grain monitor	99.00	19.00
NEC general acct.	395.00	237.00
NEC DBASE II	700.00	450.00
EPSON A/R IBM	1099.00	500.00
Info design A/R	750.00	400.00
Info design payroll	750.00	400.00
Campanion medical	450.00	250.00

Catalog lists hundreds of good buys from various dealers. You can make your own deal via phone. TO ORDER: current catalog send \$5.00 check or VISA/MC number with expiration date.

Computat Enterprises
15324 Fourth Street, Suite 125
San Rafael, California 94501

ATTENTION TEXAS INSTRUMENTS TI-99/4A OWNERS

We have hundreds of 3rd party independent software programs on cassette and disk ready to run on your TI-99/4A. Games, business, and educational programming at discount prices as low as \$9.95 ea. Plus all TI hardware and software at incredibly low, low prices, including the new TI-99/2 and CC-40 computers. We also have dust covers, heavy duty joysticks with TI adapters, and many more accessories. Call or write now for a FREE listing. We ship your order UP or the same or next business day to insure fast service. Visa and MasterCard accepted (NO service charges) or C.O.D. is okay.

THE MUSIC WORKSHOP

59 E. Tioga St.
Tunkhannock, PA 16657
CALL 1-717-836-4522

NEW!

Christmas Music

Songs and Visuals
Full Chord Capability
Excellent Song Reproduction
Spectacular Full Color Graphics

Midnight, We Three Kings Joy To The World, I Love You A Midwinter Carol, The First Noel, Jingle Bells, Mark The Words Angels Sing, O Little Town of Bethlehem, Away In A Manger, O Come All Ye Faithful, Lord Rant To Merry Gentlemen, We Wish You A Merry Christmas, Deck The Halls, O Christmas Tree, From A Mystery Song

For Use With
TI 99/4A (Cassettes only)
Comodore 64 (Cassettes & Disks)
CASSETTE: \$19.95; DISK: \$24.95

Plus 52 - for setup & handling.
Personal checks after 2 weeks with no delivery.
Washington Residents add sales tax.
Dealer inquiries welcome.

P.O. Box 6264 Dept. C10, Benton
MA 06025, (208) 228-1249

NATIONAL PROGRAMMING AND SOFTWARE

BUSINESS SOFTWARE PACKAGE

\$59

Reg. \$189

Features:

- Accounting Ledger
- Inventory Control
- Letter Writer
- Mail-Out

IBM (Peanut) VIC-20
TI-99/4A COM-64

Toll Free 1-800-221-7171
In Ga. 1-404-925-4586

BIZWARE, INC. 1014 Hwy. 29 Lubbock, TX 79407

DUST COVERS

For Personal Computers, Peripherals,
Game Units - Protective, Long-Lasting
Vinyl Resists Both Dust and Liquids.

— CHOICE OF COLORS —

Amdek	IBM PC
Apple	MacII
Atari	Rama Systems
BMC	Sanyo
Commodore	Star Micronics
Coleco	TI 99/4
Epson	Timex Sinclair
Franklin Ace	TRS 80

FOR FREE BROCHURE WRITE:

ENCHANTED FOREST
P.O. Box 5261, Newport Beach, CA 92662
(1129 W. Balboa Blvd)

VIC-20 COM-64

40/80 Columns

are now available from Sound Software. These
unique programs work with your computer's
operating system. Color display-wide characters
and graphics make these packages much more
versatile than expensive hardware devices.

SOFTSPAN 40

For the VIC-20, 40 columns to write and run
programs. Prints graphics and text can be easily
combined. Includes manual. Requires 4K for most
memory expansion.

cassette \$29.95
disk \$34.95

SOFTSPAN 80

For the Commodore 64, 2560 column display for
all your programming needs. Includes manual.
Great for business applications. Includes manual.
cassette \$29.95
disk \$34.95

Sound Software
3645 Alpine St. SE
Albany, WA 99002

Send check or money order (pay to: Sound Software). Add \$3.00 postage and
handling. WA residents add 7% state tax.
© 1985 Sound Software. All rights reserved. Commodore, VIC-20, and
COM-64 are trademarks of Commodore International, Ltd.

FREE CATALOG!

JEWEL THIEF
ADVENTURE GAME - \$19.95
CAN YOU BREAK INTO THE CRYSTAL CITY
MUSEUM AND STEAL THE 'BLUE VALLEY'
DIAMOND WITHOUT BEING CAUGHT?
FOR: VIC20 - REQUIRES 8K EXPANDER
ZX81/TIMEX1000 - REQUIRES 16K
COMMODORE 64 (1929.95)
ATARI 800 (1929.95)
ATARI 800 (1929.95)

ANDROID
STRATEGY GAME - \$24.95
RETRIEVE THE S.S.-P. FROM THE U.S. LEN
ANDROIDS. GET FIRST INTERCEPTERS.
DESTROYERS. AND THEN GEORGE.
FOR: VIC20 - REQUIRES 16K EXPANDER
ZX81/TIMEX1000 - REQUIRES 16K
COMMODORE 64

AVAILABLE ON CASSETTE OR DISK.
ADD \$1.99 FOR SHIPPING. DISK ORDERED.
CHECK OR MONEY ORDER (NO C.O.D.).
FOREIGN ORDERS ADD \$2.99.
ORDERS PROCESSED IN 1-3 DAYS.
* DEALER INQUIRIES INVITED. *

MORE PROGRAMS AVAILABLE.
SEND FOR FREE CATALOG.

CRYSTAL MICROSOFT LTD.



P.O. BOX 448952
HOUSTON, TX.
77244

Make checks or money order payable to:

THE WORLD'S FIRST
PRO-STRENGTH AEROSOL
COMPUTER PROGRAM DEBUGGER



IF PROGRAMS ARE DRIVING
YOU BUGGY
THEN

Let Us Zzap You A 12 oz. Can.
Just Send \$5.12 (of course) Plus
\$1.00 (For Postage And Handling.)

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Check Or Money Order Payable To:

STARKK ENTERPRISES

P.O. BOX 5367

LYNNWOOD, WA 98036-0890

(WA Residents Add 7.25% Sales Tax)

VIC-20

FIVE COMPLETE UTILITY PROGRAMS
FOR THE HOME OR SMALL BUSINESS

1. MAILING LIST
2. HOME INVENTORY
3. CHECKBOOK ORGANIZER
4. IRA PLANNER
5. PERSONAL FINANCE

ALL FIVE FOR ONLY:

\$9.95

(ON CASSETTE)

SEND CHECK OR MONEY ORDER
TO:

DISCOUNT SOFTWARE
122 FRANCIS AVENUE
RIVERSIDE, RI 02915

You wouldn't buy a computer
with part of it missing,
would you?

Then you shouldn't buy less
than a complete compiler!



Our compiler compiles
the full basic set for the 64,
and it's only \$29.95

SEND CHECK OR MONEY ORDER TO:

JOE LABORATORIES

310 EAST ARAPAHO, SUITE 310
NICKLAUSEN, TX 75081



PERSONAL PERIPHERAL
PRODUCTS presents:
SPEAKEASY



Cartridge Instructions & Dictionary \$59.00
FALL SPECIAL: Cassette Editor & Interface
Speaker Reg. \$19.95 with SPEAKEASY FREE
Commodore 64 Adapter Board \$12.95
BARE BONES BOARDS

Assembled Kit
8K Ram/VIC 20 Black Switched \$29.95 \$24.95
10K Ram Expander for VIC 20 \$44.95 \$44.95
3 Slot Switched & Fused Board/VIC-20 \$24.95 \$19.95
NEW: 4 Slot Switched & Fused
Board/COM-64 \$44.95 \$34.95

COMING SOON: Mighty Modem \$79.95
ADD \$1.00 Total Order Handling! Residents Add 6% Sales Tax

PERSONAL PERIPHERAL PRODUCTS
P.O. BOX 3423
FOR VALLEY MALL

AURORA, IL 60005 • (312) 963-2347

COM-64 & VIC-20 IS A TRADEMARK OF COMMODORE

COMMODORE-64

- * LOAN *
MORTGAGE
• MONTHLY PAYMENT.
• LOAN AMORTIZING.
• CALCULATE YOUR
SAVING.
• FOR ONLY \$1995

ALL THREE IN ONE PROGRAM. IT IS VERY EASY TO
RUN. THE PROGRAM WILL HELP YOU MAKE
DECISIONS ON BUYING OR SELLING YOUR HOME
BY FINDING OUT MONTHLY PAYMENTS FOR
VARIOUS INTEREST RATES. IT ALSO FINDS THE
INTEREST OF YOUR MORTGAGE FOR INCOME TAX
AT THE END OF THE YEAR AND FINDS THE FUTURE
SUM OF YOUR SAVINGS. TO ORDER PLEASE
SEND \$19.95 PER CASSETTE (ADD \$3.00 FOR
DISC). WASHINGTON RESIDENTS ADD 7% SALES
TAX! PLUS \$1.50 FOR SHIPPING TO

SIMPLE SOFTWARE

P.O. BOX 1618 - RENTON WA 98057

MAKE YOUR OWN CARTRIDGES!

- Complete System *

• Program 4K

• Cartridge to

"AUTO-RUN" (up to

4096 bytes) —

• YOUR BASIC OR

Machine Code Pages

• Prototype GAMES

• EDUCATIONAL use —

• NO Load Delay

• OS-3722 plugs into VIC-20

• Expansion socket on board

• Cards: Erasable & BLK. Locatable



OS-3722 ZIP socket module Allows programming 2764, 2732A, 2732, 2716, 2564, 2532, 2516 EPROMS	\$24.90
OS-37A System (Pgm., R.K. Card)	\$88.50
OS-37B System (Pgm., ZIP mod)	\$88.50
Software Type II (Disk add \$2)	
OS-3722 Blank 8K Cards	\$24.50
Blank 2764 EPROMS	\$11.50

OTTO SYSTEMS
8135 ENGINEER ROAD
SAN DIEGO, CA 92111
(619) 569-5665

Add \$4 Shpg. & Insulng. — C.R. res. 6% tax

Advertisers Index

Reader Service Number/Advertiser Page

102	A-T Computer Services	291
	Acadlink LTD	91
	Ad Computers	252,243
	Adco Software	145
994	Adcom Software	126
105	Adcom Software Inc	145
	Advision Inc	26,27
106	Advanced Processor Systems	249
107	Adventure International	192
108	Adventure International	192
	Allen Macintosh	256
	Alphacom	262
	Amescon Respirators	243
	Amstel Inc	209
109	Amtek Computer	272
	Amtek County Limited	31
	Amtek Technology	31
	Amtek	63
	Amtek	63
	Amtek	63
111	Aspen Systems Inc	332
	Alpha Systems	203
112	Avalon Hi-Dome Company	203
	BAE Electronics	64,67
	BAE Electronics	333
113	Big Bytes	302
	Big Software	171,17
	Big Words	314
	Swave Inc	334
	Boston Business Computing Inc	16
	BoulderSoft Software	31
	Byles and Biles	333
116	Byles Biles	332
	Byte Systems	133
	Byte Micro Technology	333
117	Cadvision Inc	67
	Cardinal Software	304
	Cos-A-Tape	316
	Cosmos Island Software	316
119	Cenitex Micro Products	316
	Cemcon Corp	65
	Chelwood Software	200
	City Software	162
120	Colin International Trading Corporation	203
	Comm Data Computer House	31
	Commmodore Business Machines	83
121	Compatible Systems Incorporated	31
	Compatible Enterprises	31
	CompCards	70
122	Computations	31
	Computational	164
	Computability	253
	ComputAbility	320
123	Computer Corps Co	304
124	Computer Decout	314
125	The Computer Experts	31
	Computer Financial	304
	Computer Humor Inc	203
126	Computer Marketing Services, Inc	35
	Computer Marketing Services Inc	35
128	Computer Marketing Services, Inc	236
129	Computer Mold Corp	241,241
130	Computer Music	31
131	Computers and More	334
132	The Computer Network	31
133	Computer Outlet	25A,25B
	Computer Outlet, SD	241
	Computer Software Associates, Inc	262
	Computer Technical	31
	Computer Business Systems	31
134	Comstar	256
	Confidential Software	41
	Confidential Software	65
	Control Data Publishing	31
	Control Computers	256,257
	Counterpart Software	16
	Creative Image	301
	Creative Software	301
136	Crysal Microsoft Ltd	331
	Dale Equipment Supply Corp	263
	Dale-Micro Industries	170
	Dolomast	61
137	Dolomast	39
	Dot Time	330
	Discount Data Supply	330
	Discount Software	330
	Disk World	333
	Draft Systems, Inc	221
	Draft-Rite Computer Software	41
	Draft Educational Systems, Inc	41
	Dover Graphics Concepts	317
	John T. Dow	315
	Dow Jones Investment Evaluator	31
	Dynacore Software, Inc	31
140	Dynacore Inc	31
	Dynacore Inc	31
	Dynacore Software	31
	Dynacore Software	31

Reader Service Number/Advertiser Page

141	Electronic Lab Industries	253
142	Electronic Software, Inc.	276
143	Electroshop Technologies	320
144	EM Tech Industries	338
145	Emulated Forest	330
146	The Emporium Co.	268
147	Empire Video Software	352
148	ENVI	275
149	ENVI	275
150	Envi-Motion	376
151	Envision Enterprises	333
152	Envision Vision	333
153	Envision Vision SA	353
154	Envision Vision	353
155	Envision Vision	353
156	Envision Vision	353
157	Envision Vision	353
158	Envision Vision	353
159	Envision Vision	353
160	Envision Vision	353
161	Envision Vision	353
162	Envision Vision	353
163	Envision Vision	353
164	Envision Vision	353
165	Envision Vision	353
166	Envision Vision	353
167	Envision Vision	353
168	Envision Vision	353
169	Envision Vision	353
170	Envision Vision	353
171	Envision Vision	353
172	Envision Vision	353
173	Envision Vision	353
174	Envision Vision	353
175	Envision Vision	353
176	Envision Vision	353
177	Envision Vision	353
178	Envision Vision	353
179	Envision Vision	353
180	Envision Vision	353
181	Envision Vision	353
182	Envision Vision	353
183	Envision Vision	353
184	Envision Vision	353
185	Envision Vision	353
186	Envision Vision	353
187	Envision Vision	353
188	Envision Vision	353
189	Envision Vision	353
190	Envision Vision	353
191	Envision Vision	353
192	Envision Vision	353
193	Envision Vision	353
194	Envision Vision	353
195	Envision Vision	353
196	Envision Vision	353
197	Envision Vision	353
198	Envision Vision	353
199	Envision Vision	353
200	Envision Vision	353

Reader Service Number/Advertiser Page

402	Professional Software	9
403	Professional Software	9
404	Programmer's Institute	14
405	Programmer's Institute	14
406	Programmer's Institute	30
	The Program Store	248, 249
407	Protecta Enterprises	91
408	Protecta Enterprises	91
409	Protecta Enterprises	172, 173
410	Protecta Enterprises	183, 184
411	Protecta Enterprises	183
412	Protecta Enterprises	183
413	Protecta Enterprises	183
414	Protecta Enterprises	178, 179
415	Protecta Enterprises	192, 193
416	Protecta Enterprises	192
417	Pycorn Software International	1
418	Public Domain, Inc.	37
419	Quality Computer	23
420	Quantix Systems, Inc.	11
421	Quantix Systems, Inc.	11
422	Rancom Computer Corp.	29
423	Rancom Computer Corp.	29
424	Rancom Computer Corp.	29
425	Rancom Computer Corp.	29
426	Rancom Computer Corp.	29
427	Rancom Computer Corp.	29
428	Rancom Computer Corp.	29
429	Rancom Computer Corp.	29
430	Rancom Computer Corp.	29
431	Rancom Computer Corp.	29
432	Rancom Computer Corp.	29
433	Rancom Computer Corp.	29
434	Rancom Computer Corp.	29
435	Rancom Computer Corp.	29
436	Rancom Computer Corp.	29
437	Rancom Computer Corp.	29
438	Rancom Computer Corp.	29
439	Rancom Computer Corp.	29
440	Rancom Computer Corp.	29
441	Rancom Computer Corp.	29
442	Rancom Computer Corp.	29
443	Rancom Computer Corp.	29
444	Rancom Computer Corp.	29
445	Rancom Computer Corp.	29
446	Rancom Computer Corp.	29
447	Rancom Computer Corp.	29
448	Rancom Computer Corp.	29
449	Rancom Computer Corp.	29
450	Rancom Computer Corp.	29
451	Rancom Computer Corp.	29
452	Rancom Computer Corp.	29
453	Rancom Computer Corp.	29
454	Rancom Computer Corp.	29
455	Rancom Computer Corp.	29
456	Rancom Computer Corp.	29
457	Rancom Computer Corp.	29
458	Rancom Computer Corp.	29
459	Rancom Computer Corp.	29
460	Rancom Computer Corp.	29
461	Rancom Computer Corp.	29
462	Rancom Computer Corp.	29
463	Rancom Computer Corp.	29
464	Rancom Computer Corp.	29
465	Rancom Computer Corp.	29
466	Rancom Computer Corp.	29
467	Rancom Computer Corp.	29
468	Rancom Computer Corp.	29
469	Rancom Computer Corp.	29
470	Rancom Computer Corp.	29
471	Rancom Computer Corp.	29
472	Rancom Computer Corp.	29
473	Rancom Computer Corp.	29
474	Rancom Computer Corp.	29
475	Rancom Computer Corp.	29
476	Rancom Computer Corp.	29
477	Rancom Computer Corp.	29
478	Rancom Computer Corp.	29
479	Rancom Computer Corp.	29
480	Rancom Computer Corp.	29
481	Rancom Computer Corp.	29
482	Rancom Computer Corp.	29
483	Rancom Computer Corp.	29
484	Rancom Computer Corp.	29
485	Rancom Computer Corp.	29
486	Rancom Computer Corp.	29
487	Rancom Computer Corp.	29
488	Rancom Computer Corp.	29
489	Rancom Computer Corp.	29
490	Rancom Computer Corp.	29
491	Rancom Computer Corp.	29
492	Rancom Computer Corp.	29
493	Rancom Computer Corp.	29
494	Rancom Computer Corp.	29
495	Rancom Computer Corp.	29
496	Rancom Computer Corp.	29
497	Rancom Computer Corp.	29
498	Rancom Computer Corp.	29
499	Rancom Computer Corp.	29
500	Rancom Computer Corp.	29
501	Rancom Computer Corp.	29
502	Rancom Computer Corp.	29
503	Rancom Computer Corp.	29
504	Rancom Computer Corp.	29
505	Rancom Computer Corp.	29
506	Rancom Computer Corp.	29
507	Rancom Computer Corp.	29
508	Rancom Computer Corp.	29
509	Rancom Computer Corp.	29
510	Rancom Computer Corp.	29
511	Rancom Computer Corp.	29
512	Rancom Computer Corp.	29
513	Rancom Computer Corp.	29
514	Rancom Computer Corp.	29
515	Rancom Computer Corp.	29
516	Rancom Computer Corp.	29
517	Rancom Computer Corp.	29
518	Rancom Computer Corp.	29
519	Rancom Computer Corp.	29
520	Rancom Computer Corp.	29
521	Rancom Computer Corp.	29
522	Rancom Computer Corp.	29
523	Rancom Computer Corp.	29
524	Rancom Computer Corp.	29
525	Rancom Computer Corp.	29
526	Rancom Computer Corp.	29
527	Rancom Computer Corp.	29
528	Rancom Computer Corp.	29
529	Rancom Computer Corp.	29
530	Rancom Computer Corp.	29
531	Rancom Computer Corp.	29
532	Rancom Computer Corp.	29
533	Rancom Computer Corp.	29
534	Rancom Computer Corp.	29
535	Rancom Computer Corp.	29
536	Rancom Computer Corp.	29
537	Rancom Computer Corp.	29
538	Rancom Computer Corp.	29
539	Rancom Computer Corp.	29
540	Rancom Computer Corp.	29
541	Rancom Computer Corp.	29
542	Rancom Computer Corp.	29
543	Rancom Computer Corp.	29
544	Rancom Computer Corp.	29
545	Rancom Computer Corp.	29
546	Rancom Computer Corp.	29
547	Rancom Computer Corp.	29
548	Rancom Computer Corp.	29
549	Rancom Computer Corp.	29
550	Rancom Computer Corp.	29
551	Rancom Computer Corp.	29
552	Rancom Computer Corp.	29
553	Rancom Computer Corp.	29
554	Rancom Computer Corp.	29
555	Rancom Computer Corp.	29
556	Rancom Computer Corp.	29
557	Rancom Computer Corp.	29
558	Rancom Computer Corp.	29
559	Rancom Computer Corp.	29
560	Rancom Computer Corp.	29
561	Rancom Computer Corp.	29
562	Rancom Computer Corp.	29
563	Rancom Computer Corp.	29
564	Rancom Computer Corp.	29
565	Rancom Computer Corp.	29
566	Rancom Computer Corp.	29
567	Rancom Computer Corp.	29
568	Rancom Computer Corp.	29
569	Rancom Computer Corp.	29
570	Rancom Computer Corp.	29
571	Rancom Computer Corp.	29
572	Rancom Computer Corp.	29
573	Rancom Computer Corp.	29
574	Rancom Computer Corp.	29
575	Rancom Computer Corp.	29
576	Rancom Computer Corp.	29
577	Rancom Computer Corp.	29
578	Rancom Computer Corp.	29
579	Rancom Computer Corp.	29
580	Rancom Computer Corp.	29
581	Rancom Computer Corp.	29
582	Rancom Computer Corp.	29
583	Rancom Computer Corp.	29
584	Rancom Computer Corp.	29
585	Rancom Computer Corp.	29
586	Rancom Computer Corp.	29
587	Rancom Computer Corp.	29
588	Rancom Computer Corp.	29
589	Rancom Computer Corp.	29
590	Rancom Computer Corp.	29
591	Rancom Computer Corp.	29
592	Rancom Computer Corp.	29
593	Rancom Computer Corp.	29
594	Rancom Computer Corp.	29
595	Rancom Computer Corp.	29
596	Rancom Computer Corp.	29
597	Rancom Computer Corp.	29
598	Rancom Computer Corp.	29
599	Rancom Computer Corp.	29
600	Rancom Computer Corp.	29
601	Rancom Computer Corp.	29
602	Rancom Computer Corp.	29
603	Rancom Computer Corp.	29
604	Rancom Computer Corp.	29
605	Rancom Computer Corp.	29
606	Rancom Computer Corp.	29
607	Rancom Computer Corp.	29
608	Rancom Computer Corp.	29
609	Rancom Computer Corp.	29
610	Rancom Computer Corp.	29
611	Rancom Computer Corp.	29
612	Rancom Computer Corp.	29
613	Rancom Computer Corp.	29
614	Rancom Computer Corp.	29
615	Rancom Computer Corp.	29
616	Rancom Computer Corp.	29
617	Rancom Computer Corp.	29
618	Rancom Computer Corp.	29
619	Rancom Computer Corp.	29
620	Rancom Computer Corp.	29
621	Rancom Computer Corp.	29
622	Rancom Computer Corp.	29
623	Rancom Computer Corp.	29
624	Rancom Computer Corp.	29
625	Rancom Computer Corp.	29
626	Rancom Computer Corp.	29
627	Rancom Computer Corp.	29
628	Rancom Computer Corp.	29
629	Rancom Computer Corp.	29
630	Rancom Computer Corp.	29
631	Rancom Computer Corp.	29
632	Rancom Computer Corp.	29
633	Rancom Computer Corp.	29
634	Rancom Computer Corp.	29
635	Rancom Computer Corp.	29
636	Rancom Computer Corp.	29
637	Rancom Computer Corp.	29
638	Rancom Computer Corp.	29
639	Rancom Computer Corp.	29
640	Rancom Computer Corp.	29
641	Rancom Computer Corp.	29
642	Rancom Computer Corp.	29
643	Rancom Computer Corp.	29
644	Rancom Computer Corp.	29
645	Rancom Computer Corp.	29
646	Rancom Computer Corp.	29
647	Rancom Computer Corp.	29
648	Rancom Computer Corp.	29
649	Rancom Computer Corp.	29
650	Rancom Computer Corp.	29
651	Rancom Computer Corp.	29
652	Rancom Computer Corp.	29
653	Rancom Computer Corp.	29
654	Rancom Computer Corp.	29
655	Rancom Computer Corp.	29
656	Rancom Computer Corp.	29
657	Rancom Computer Corp.	29
658	Rancom Computer Corp.	29
659	Rancom Computer Corp.	29
660	Rancom Computer Corp.	29
661	Rancom Computer Corp.	29
662	Rancom Computer Corp.	29
663	Rancom Computer Corp.	29
664	Rancom Computer Corp.	29
665	Rancom Computer Corp.	29
666	Rancom Computer Corp.	29
667	Rancom Computer Corp.	29
668	Rancom Computer Corp.	29
669	Rancom Computer Corp.	29
670	Rancom Computer Corp.	29
671	Rancom Computer Corp.	29
672	Rancom Computer Corp.	29
673	Rancom Computer Corp.	29
674	Rancom Computer Corp.	29
675	Rancom Computer Corp.	29
676	Rancom Computer Corp.	29
677	Rancom Computer Corp.	29
678	Rancom Computer Corp.	29
679	Rancom Computer Corp.	29
680	Rancom Computer Corp.	29
681	Rancom Computer Corp.	29
682	Rancom Computer Corp.	29
683	Rancom Computer Corp.	29
684	Rancom Computer Corp.	29
685	Rancom Computer Corp.	29
686	Rancom Computer Corp.	29
687	Rancom Computer Corp.	29
688	Rancom Computer Corp.	29
689	Rancom Computer Corp.	29
690	Rancom Computer Corp.	29
691	Rancom Computer Corp.	29
692	Rancom Computer Corp.	29
693	Rancom Computer Corp.	29
694	Rancom Computer Corp.	29
695	Rancom Computer Corp.	29
696	Rancom Computer Corp.	29
697	Rancom Computer Corp.	29
698	Rancom Computer Corp.	29
699	Rancom Computer Corp.	29
700	Rancom Computer Corp.	29
701	Rancom Computer Corp.	29
702	Rancom Computer Corp.	29
703	Rancom Computer Corp.	29
704	Rancom Computer Corp.	29
705	Rancom Computer Corp.	29
706	Rancom Computer Corp.	29
707	Rancom Computer Corp.	29
708	Rancom Computer Corp.	29
709	Rancom Computer Corp.	29
710	Rancom Computer Corp.	29
711	Rancom Computer Corp.	29
712	Rancom Computer Corp.	29
713	Rancom Computer Corp.	29
714	Rancom Computer Corp.	29
715	Rancom Computer Corp.	29
716	Rancom Computer Corp.	29
717	Rancom Computer Corp.	29
718	Rancom Computer Corp.	29
719	Rancom Computer Corp.	29
720	Rancom Computer Corp.	29
721	Rancom Computer Corp.	29
722	Rancom Computer Corp.	29
723	Rancom Computer Corp.	29
724	Rancom Computer Corp.	29
725	Rancom Computer Corp.	29
726	Rancom Computer Corp.	29
727	Rancom Computer Corp.	29
728	Rancom Computer Corp.	29
729	Rancom Computer Corp.	29
730	Rancom Computer Corp.	29
731	Rancom Computer Corp.	29
732	Rancom Computer Corp.	29
733	Rancom Computer Corp.	29
734	Rancom Computer Corp.	29
735	Rancom Computer Corp.	29
736	Rancom Computer Corp.	29
737	Rancom Computer Corp.	29
738	Rancom Computer Corp.	29
739	Rancom Computer Corp.	29
740	Rancom Computer Corp.	29
741	Rancom Computer Corp.	29
742	Rancom Computer Corp.	29
743	Rancom Computer Corp.	29
744	Rancom Computer Corp.	29
745	Rancom Computer Corp.	29
746	Rancom Computer Corp.	29
747	Rancom Computer Corp.	29
748	Rancom Computer Corp.	29
749	Rancom Computer Corp.	29
750	Rancom Computer Corp.	29
751	Rancom Computer Corp.	29
752	Rancom Computer Corp.	29
753	Rancom Computer Corp.	29
754	Rancom Computer Corp.	29
755	Rancom Computer Corp.	29
756	Rancom Computer Corp.	29
757	Rancom Computer Corp.	29
758	Rancom Computer Corp.	29
759	Rancom Computer Corp.	29
760	Rancom Computer Corp.	29
761	Rancom Computer Corp.	29
762	Rancom Computer Corp.	29
763	Rancom Computer Corp.	29
764	Rancom Computer Corp.	29
765	Rancom Computer Corp.	29
766	Rancom Computer Corp.	29
767	Rancom Computer Corp.	29
768	Rancom Computer Corp.	29
769	Rancom Computer Corp.	29
770	Rancom Computer Corp.	29
771	Rancom Computer Corp.	29
772	Rancom Computer Corp.	29
773	Rancom Computer Corp.	29
774	Rancom Computer Corp.	29
775	Rancom Computer Corp.	29
776	Rancom Computer Corp.	29
777	Rancom Computer Corp.	29
778	Rancom Computer Corp.	29
779	Rancom Computer Corp.	29
780	Rancom Computer Corp.	29
781	Rancom Computer Corp.	29
782	Rancom Computer Corp.	29
783	Rancom Computer Corp.	29
784	Rancom Computer Corp.	29
785	Rancom Computer Corp.	29
786	Rancom Computer Corp.	29
787	Rancom Computer Corp.	29
788	Rancom Computer Corp.	29
789	Rancom Computer Corp.	29
790	Rancom Computer Corp.	29
791	Rancom Computer Corp.	29
792	Rancom Computer Corp.	29
793	Rancom Computer Corp.	29
794	Rancom Computer Corp.	29
795	Rancom Computer Corp.	29
796	Rancom Computer Corp.	29
797	Rancom Computer Corp.	29
798	Rancom Computer Corp.	29
799	Rancom Computer Corp.	29
800	Rancom Computer Corp.	29
801	Rancom Computer Corp.	29
802	Rancom Computer Corp.	29
803	Rancom Computer Corp.	29
804	Rancom Computer Corp.	29
805	Rancom Computer Corp.	29
806	Rancom Computer Corp.	29
807	Rancom Computer Corp.	29
808	Rancom Computer Corp.	29
809	Rancom Computer Corp.	29
810	Rancom Computer Corp.	29
811	Rancom Computer Corp.	29
812	Rancom Computer Corp.	29
813	Rancom Computer Corp.	29
814	Rancom Computer Corp.	29
815	Rancom Computer Corp.	29
816	Rancom Computer Corp.	29
817	Rancom Computer Corp.	29
818	Rancom Computer Corp.	29
819	Rancom Computer Corp.	29
820	Rancom Computer Corp.	29
821	Rancom Computer Corp.	29
822	Rancom Computer Corp.	29
823	Rancom Computer Corp.	29
824	Rancom Computer Corp.	29
825	Rancom Computer Corp.	29
826	Rancom Computer Corp.	29
827	Rancom Computer Corp.	29
828	Rancom Computer Corp.	29
829	Rancom Computer Corp.	29
830	Rancom Computer Corp.	29
831	Rancom Computer Corp.	29
832	Rancom Computer Corp.	29
833	Rancom Computer Corp.	29
834	Rancom Computer Corp.	29
835	Rancom Computer Corp.	29
836	Rancom Computer Corp.	29
837	Rancom Computer Corp.	29
838	Rancom Computer Corp.	29
839	Rancom Computer Corp.	29
840	Rancom Computer Corp.	29
841	Rancom Computer Corp.	29
842	Rancom Computer Corp.	29

TRUNKS FOR THE MEMORIES.



Introducing the most logical place to store Elephant Memory Systems® (or lesser brands of disks) The Trunk.

With its alphabetized library index, you can file or retrieve up to 60 disks, instantly.

The Trunk is made of durable molded plastic with a hinged, one-piece lid, to keep disks safe from dust, dirt, and other detriments which disks despise.

And, it's portable. Because the lid doubles as a carrying handle so your Elephant Memory Systems® disks can go anywhere you do.

There's a model for 5¼" and 8" floppies, as well as a cassette-and-game file and a special Atari® version.

So if you're looking for the best disk storage system on the market...

The Trunk is an open-and-shut case.

THE TRUNK. ENDORSED BY ELEPHANTS.

Elephant Memory Systems® Disks

A full line of top-quality floppies, in virtually every 5¼" and 8" model, for compatibility with virtually every computer on the market. Guaranteed to meet or exceed every industry standard, certified 100% error-free and problem-free, and to maintain its quality for at least 12 million passes for over a life-time of heavy-duty use!

Marketed exclusively by Leading Edge Products, Inc., Information Systems and Supplies Division, 55 Providence Highway, Norwood, Massachusetts 02062. Call toll-free 1-800-343-8413; or in Massachusetts call collect (617) 769-8150. Telex 961-624.

IF PERSONAL COMPUTERS ARE FOR EVERYBODY, HOW COME THEY'RE PRICED FOR NOBODY?

A personal computer is supposed to be a computer for persons. Not just wealthy persons. Or whiz-kid persons. Or privileged persons.

But person persons. In other words, all the persons whom Apple, IBM, and Radio Shack seem to have forgotten about (including, most likely, you).

But that's okay. Because now you can get a high-powered home computer without taking out a second mortgage on your home.

It's the Commodore 64. We're not talking about a low-priced computer that can barely retain a phone number. We're talking about a memory of 64K. Which means it can perform tasks most

Apple is a registered trademark of Apple Computer, Inc. TRS-80 is a registered trademark of Tandy Corp. IBM is a registered trademark of International Business Machines Corp.

\$1395*
APPLE® IIe 64K

\$999*
TRS-80® III 16K

\$1355*
IBM® PC 64K

other home computers can't. Including some of those that cost a lot more. (Take another look at the three computers above.)

By itself, the Commodore 64 is all the computer you'll ever need. Yet, if you do want to expand its capabilities some day, you can do so by adding a full complement of Commodore peripherals. Such as disk drives. Modems. And printers.

You can also play terrific games on the Commodore 64. Many of which

will be far more challenging than those you could ever play on a game machine alone. And as great as all this sounds, what's even greater-sounding

is the price. It's hundreds of dollars less than that of our nearest competitor.

So while other companies are trying to take advantage of the computer revolution, it seems to us they're really taking advantage of something else: Their customers.

*Manufacturers' suggested list prices. Monitor included with TRS-80 III only. Commodore Business Machines—PO Box 500R, Coraopolis, PA 15108. Canada—3370 Pharmacy Avenue, Agincourt, Ont., Can. M1W 2K4.

commodore
COMPUTERS



THE COMMODORE 64. UNDER \$300.*

You can't buy a better computer at twice the price.

RETROMAGS

Our goal is to preserve classic video game magazines so that they are not lost permanently.

People interested in helping out in any capacity,
please visit us at www.retromags.com.

No profit is made from these scans, nor do we offer anything
available from the publishers themselves.

If you come across anyone selling releases from
this site, please do not support them and do let us know.

Thank you!

